

Mining

CONGRESS JOURNAL



DECEMBER
1946





Tradition

*It has become a tradition with us to
extend to you—our Many Friends
in the Mining Industry—*

Cordial Holiday Greetings

We have other traditions:

Excellence of Quality

Sincerity of Cooperation

Pride of Workmanship

and a

Genuine Desire to be of Service

*Knox Manufacturing Company
8th and Cherry Streets, Philadelphia 7, Pa.*

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Valves-Couplers-Nipples-Clamps-Menders

Mining

CONGRESS JOURNAL

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VOLUME 32, NUMBER 12

FOR DECEMBER, 1946

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FRONT COVER: Washington Cathedral at Christmas time.

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(Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress)

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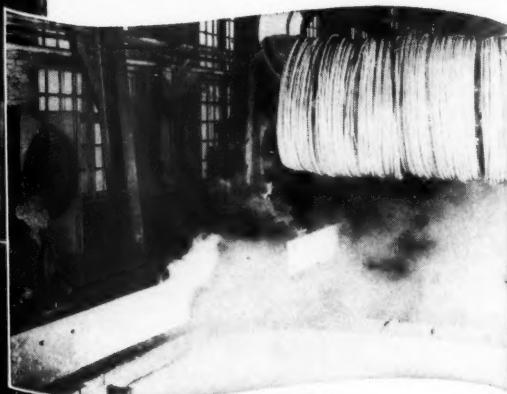
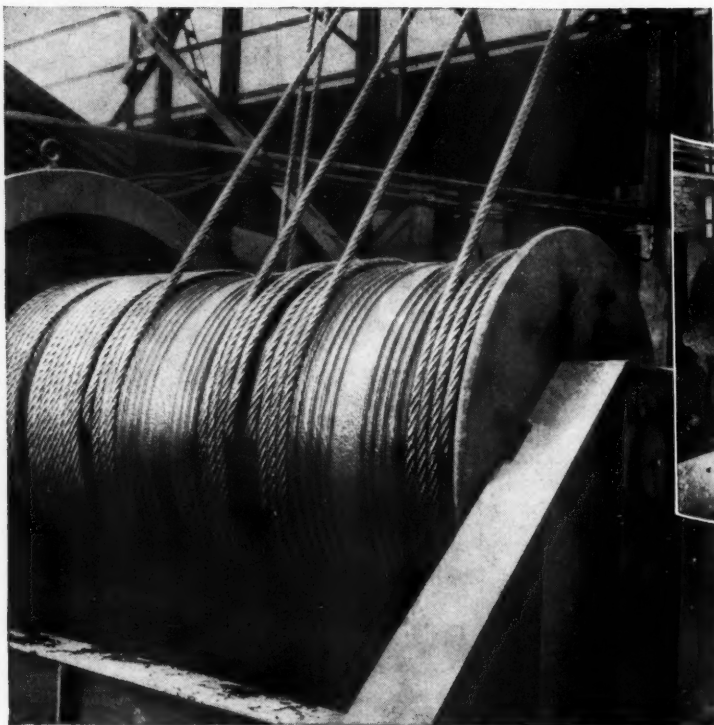
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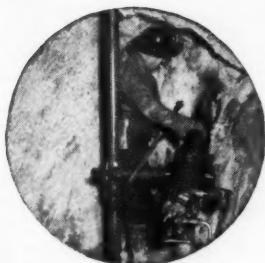
1
Drill runner collars a hole with Gardner-Denver CF89H Automatic Feed Drifting Drill. He selects proper feeding pressure and opens throttle to run down the 2' starter steel.



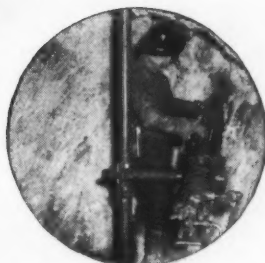
2
Runner lights and smokes a cigarette while the drill continues to run automatically.



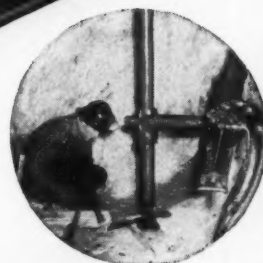
3
Runner picks up the second steel, 4' length, and when starter is run out, throws throttle to blowing position, cleans hole, closes throttle and reverses feed.



4
Runner removes starter steel from drill chuck.



5
Runner inserts second steel in hole and drill chuck.



6
While drilling out the second steel, runner removes the drill bit and puts sharp bit on the starter for the next hole, and places 6' steel in handy position for the next change.

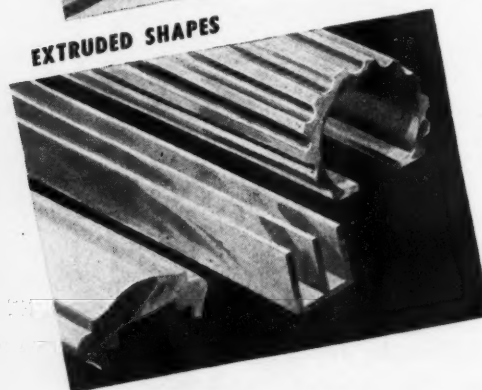
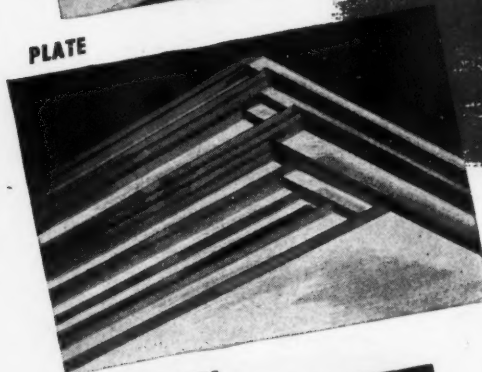
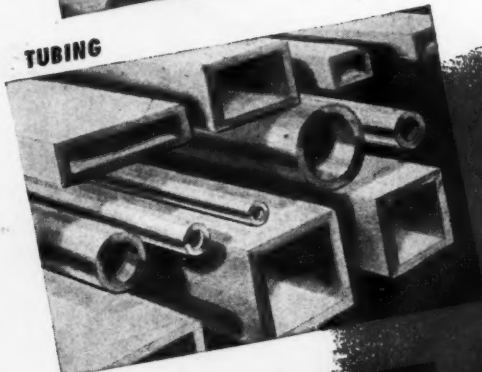
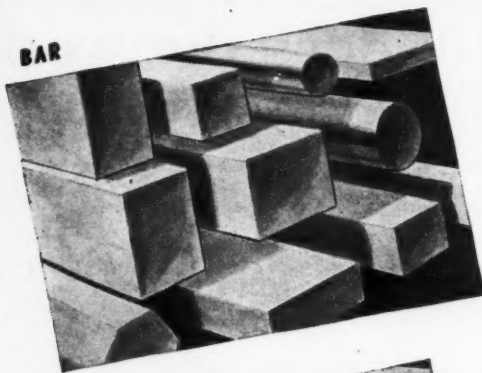


The photographs on this page show why drill runners and mine operators call the Gardner-Denver CF89H the *only* completely automatic drifter on the market.

Smooth-running—free from vibration—the Gardner-Denver CF89H Automatic Feed Drifter can show you something NEW in the way of performance and dependability. For full information, write Gardner-Denver Company, Quincy, Illinois.

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167-9

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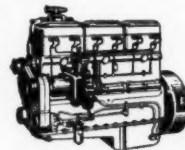
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In behalf of its 67 Direct Factory Branches and 600 Dealers

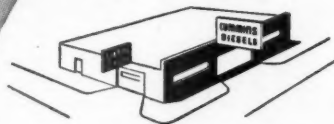


dependable

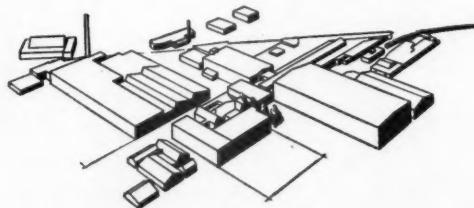
THE ENGINE



THE DEALER



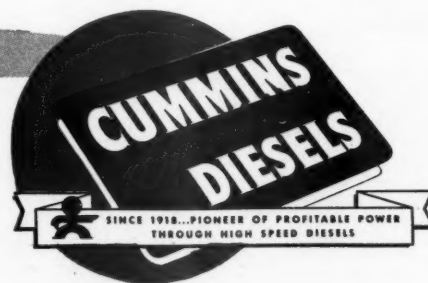
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a dependable engine . . . proven dependable and economical on jobs such as yours.

a dependable dealer . . . near you . . . on call 24 hours a day with adequate parts and dependable mechanics.

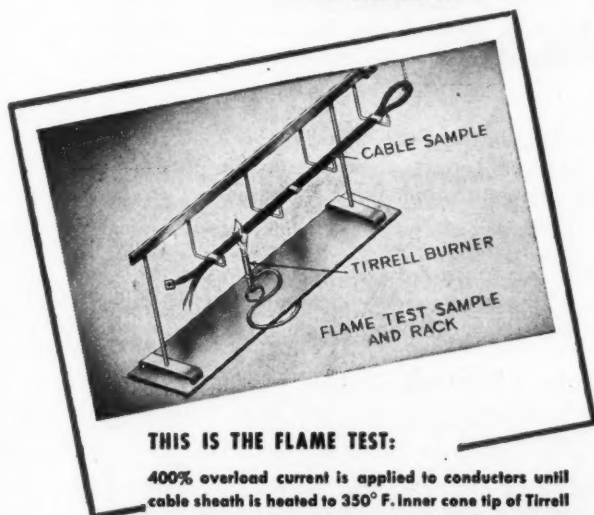
a dependable manufacturer . . . who puts quality ahead of quantity . . . who recognizes that service comes ahead of sales.



CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

SERVING YOU THROUGH SCIENCE

WHAT IT MEANS ON U. S. ROYAL SAFETY TESTED MINING MACHINE AND LOCOMOTIVE CABLES



THIS IS THE FLAME TEST:

400% overload current is applied to conductors until cable sheath is heated to 350° F. Inner cone tip of Tirrell burner flame then applied for 1 minute to bottom surface of folded cable. Total length charred is measure of flame-resistance and shall not exceed 14 in. U. S. Royal Mining Cables pass test with extra margin of safety.

P-103 is an official number assigned to United States Rubber Company by the Department of Mines of the Commonwealth of Pennsylvania. It indicates that all U. S. Royal Mining Cables bearing this number conform to strict fire-prevention regulations established by the Department.

The name "U. S. Royal", on Mining Machine and Locomotive Cables indicates that they have not only passed a severe "Flame-Resistance" test, but also tests for moisture-absorption, bending, twisting, impact and stretch.



SPECIFY THE NEW U. S. ROYAL *Safety Tested* MINING MACHINE AND LOCOMOTIVE CABLES

UNITED STATES RUBBER COMPANY

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KEEPING THE COUNTRY UP-TO-THE-MINUTE ON A PROGRESSIVE INDUSTRY

Recently reorganized for even greater effectiveness, the Bituminous Coal Institute now begins a big new program to win and hold friends for the industry.

B.C.I. now sponsors five hard-hitting campaigns of national advertising, aimed at five vital sections of opinion!

1 In *Time*, *Look*, *Newsweek*, *Pathfinder*, *Business Week*, *U.S. News*, and *Iron Age*, Bituminous Coal Institute advertisements present business men and the general public with an up-to-date picture of Bituminous Coal research and how miners work and live.

2 In the *Architectural Forum*, *Architectural Record*, *American Builder*, and *Home Owners' Catalogs*, B.C.I. stresses the need of building home chimneys and basement facilities which allow for the efficient use of coal as a domestic fuel.

3 In the *Scholastic Teacher*, *Instructor*, *Grade Teacher*, and *Journal of Geography*, B.C.I. advertising corrects common misconceptions by providing teachers with up-to-the-minute supplements to textbook facts on the coal industry.

4 In *Editor and Publisher*, *American Press*, *National Publisher*, and *Publishers' Auxiliary*, B.C.I. advertising offers editors and writers every possible service in obtaining helpful facts on all phases of the coal industry.

5 In eight retail coal dealer publications, B.C.I. advertising keeps dealers posted on the parts of its national program which tie in with their local efforts to promote coal as a domestic fuel.

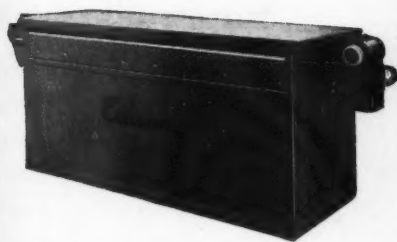
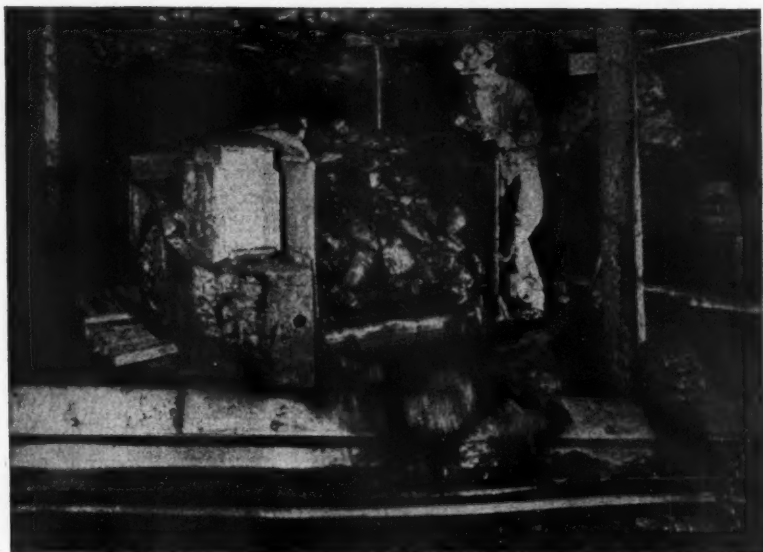
B.C.I. advertising is part of a broad, practical public relations program for the benefit of the entire industry. With three years of solid accomplishment behind it, and with a brighter, more helpful future ahead of it, B.C.I. deserves the active support of every forward-looking Bituminous Coal producer.

BITUMINOUS  COAL INSTITUTE

Affiliate of NATIONAL COAL ASSOCIATION, Washington, D. C.

BITUMINOUS COAL...LIGHTS THE WAY...FUELS THE FIRES...POWERS THE PROGRESS OF AMERICA

Use BATTERY-POWERED shuttle cars for greatest safety



...ALKALINE
BATTERIES

for most dependable power

BECAUSE they carry their own power supply, battery-operated shuttle cars are a distinct asset to the maintenance of utmost safety underground. They eliminate the possibility of danger from making and breaking connections to an external power supply. They are also available as permissible equipment approved by the Bureau of Mines.

Besides their safety advantages, battery-powered shuttle cars are the most flexible gathering units, have fewer moving parts requiring attention and replacements, reduce power peaks on the mine d-c supply, and have highest availability for service.

With batteries exchanged at the end of each shift, a shuttle car is kept continuously supplied with power. While one battery operates the car, the other is being charged.

Altogether the battery-powered shuttle car is an extremely dependable and efficient gathering unit—especially when powered with Edison Alkaline Batteries. Steel-cell construction, an electrolyte that is a preservative of steel, and a fool-proof principle of operation make alkaline batteries the most durable, longest-lived and most trouble free of all batteries offered for mine haulage services. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Co., Ltd., Montreal and Toronto.

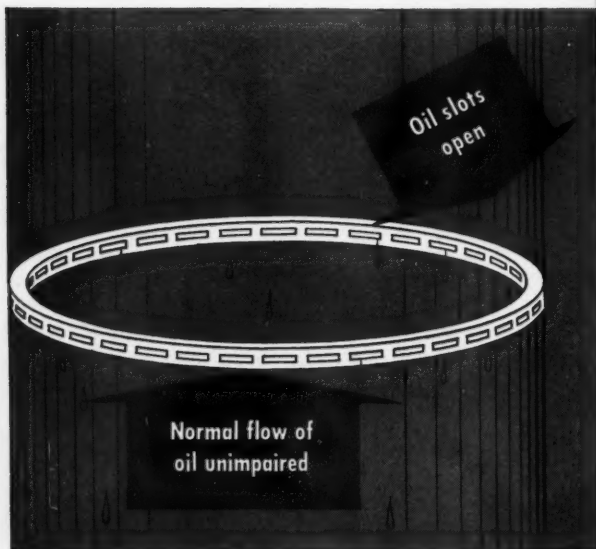
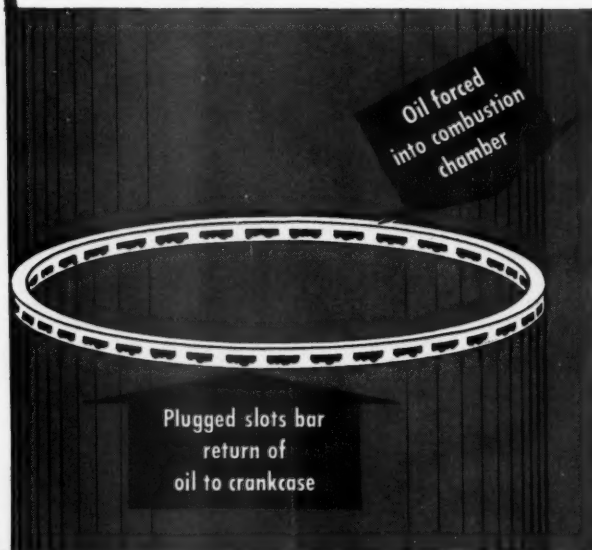
Edison

ALKALINE BATTERIES

Diesel Engine **DANGER** points

Plugged Oil Slots Increase Oil Consumption

When carbon and gum formations clog oil-ring slots, the oil which would normally return through these apertures to the crankcase is forced into the combustion chamber. Here it joins the other products of combustion which "coke" on the ring belt area cementing the rings in their grooves and aggravating the clogged condition of the ring slots.



RPM DELO Oil keeps oil slots open, prevents stuck rings

RPM DELO Diesel Engine Lubricating Oil is compounded to prevent engine deposits these three ways:

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2. A detergent prevents deposits forming on rings and pistons, keeping engines cleaner.
3. A dispersive agent insures removal of this material when the oil is drained.

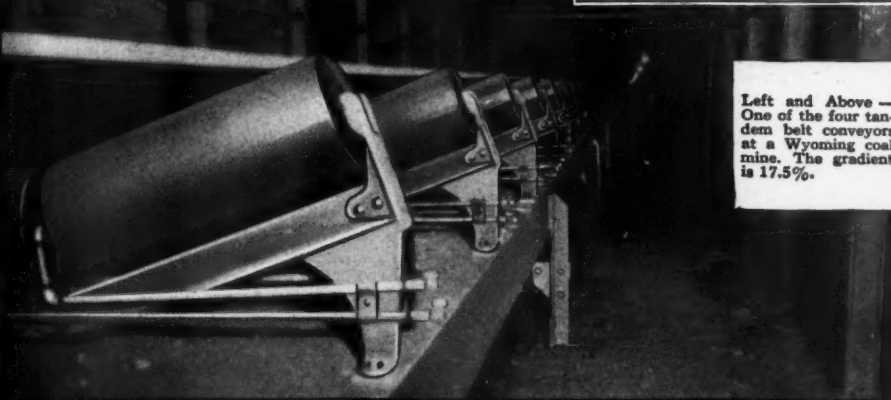
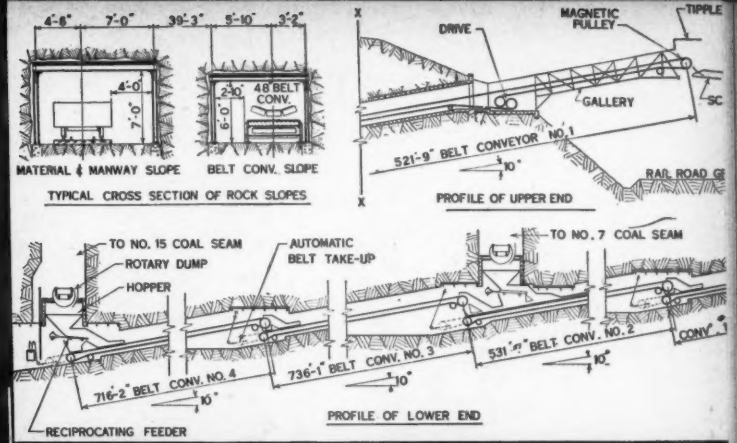
Other compounds in RPM DELO Oil minimize hot-spot wear, prevent corrosion, eliminate foaming.

To match the fine performance of RPM DELO OIL, use these equally efficient companion products from the same famous "RPM" line—RPM HEAVY DUTY MOTOR OIL—RPM COMPOUNDED MOTOR OIL—RPM GEAR OILS AND LUBRICANTS—RPM GREASES. For additional information or name of your distributor, write any of the companies below:

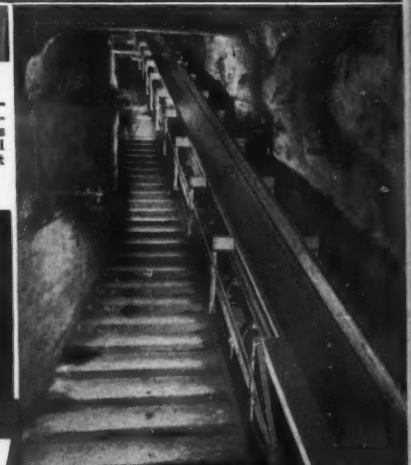
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THE CALIFORNIA COMPANY • 17th and Stout Streets, Denver 1, Colorado
STANDARD OIL COMPANY OF TEXAS • El Paso, Texas
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LINK-BELT CONVEYOR SLOPE HAULAGE



Left and Above — One of the four tandem belt conveyors at a Wyoming coal mine. The gradient is 17.5%.



Above—Link-Belt slope belt conveyor (891 ft. mine bottom to preparation plant) Weirton Coal Isabella, Penna. Below—900 ft. long Link-Belt conveyor extending from a point 250 ft. below surface on a 17° slope to the tipple at Louisville Gas & Electric Company, Cherry Hill Mine.

Continuous COAL FLOW → Boosts Output—Cuts Costs

Now—more than ever—you need the highest possible mine output at the lowest cost per ton.

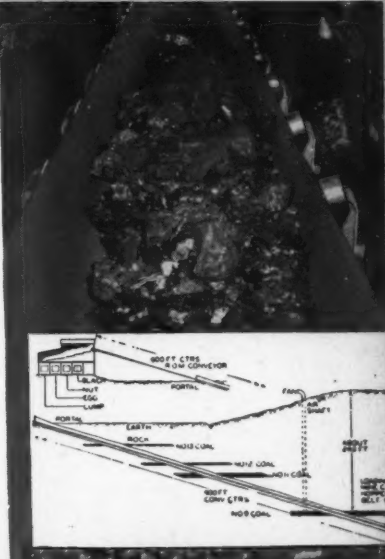
Where it is applicable, Link-Belt Conveyor Slope Haulage has the advantages of high capacities . . . low-cost-per-ton of coal handled . . . uniform delivery . . . low maintenance cost . . . less wear and tear on mine cars.

Of an installation transporting 6,000,000 tons in a little over five years, (four 48" belts in tandem, 2600' from mine bottom to tipple), a mine executive said, "The performance of these conveyors has been most satisfactory, with no major breakdowns and a very satisfactory maintenance cost, and we have had no replacements of any major items of machinery or structure. And the conveyor belts proper are in excellent condition." Have a Link-Belt engineer give you the complete story.

LINK-BELT COMPANY

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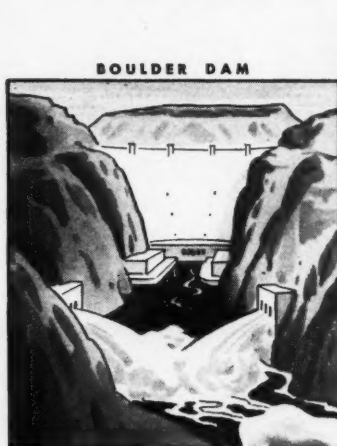
COAL PREPARATION AND HANDLING EQUIPMENT

Engineered,
Built and Backed by



LINK-BELT

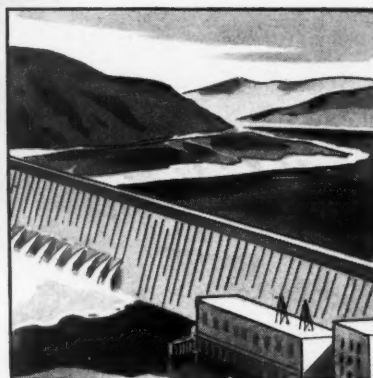
A MESSAGE TO THE MINING INDUSTRY



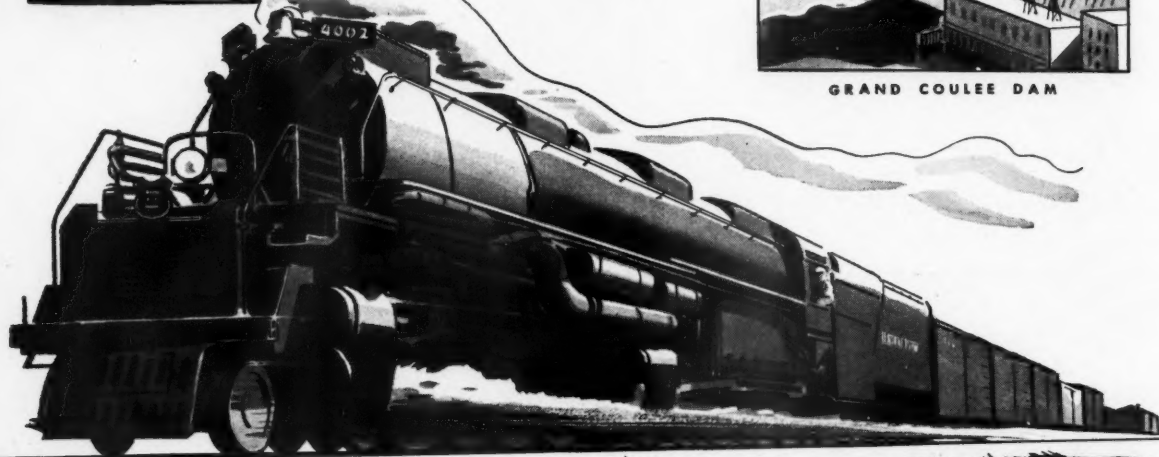
BOULDER DAM



BONNEVILLE DAM



GRAND COULEE DAM

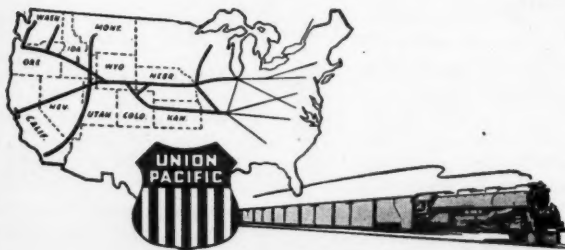


More POWER
to you

Three great dams, harnessing the natural force of the Colorado and Columbia Rivers, provide tremendous industrial power.

Giants of the rails, the Union Pacific "Big Boy" locomotives provide freight transportation power over the Strategic Middle Route.

Power, light, and efficient transportation . . . combined with a wealth of raw materials and adequate "growing space" . . . offer unusual opportunities for industry in the Union Pacific West.



be Specific -
say "Union Pacific"

★ Union Pacific will gladly furnish confidential information regarding available industrial sites having trackage facilities in the territory it serves. Address Industrial Dept., Union Pacific Railroad, Omaha 2, Nebraska.

UNION PACIFIC RAILROAD
The Strategic Middle Route

RUGGED Simplicity



**-For Greater Efficiency
On All Lengths of Haul**



Rear-Dump and Bottom-Dump EUCLIDS have earned their reputation for dependable and efficient off-the-highway hauling on hundreds of the toughest jobs. In mines, quarries, heavy construction, and industrial applications too, the rugged simplicity of Euclids has resulted in lower hauling costs.

Built to withstand the pounding of heavy excavation and ore loaded by large shovels and draglines, Euclids combine minimum weight with maximum power and speed. Fast loading with modern digging equipment... speed in dumping and on the haul road... rugged simplicity that means efficient and dependable performance longer... these are reasons why more and more users of off-the-highway hauling equipment depend on Euclids to keep their hauling costs down.

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EUCLID

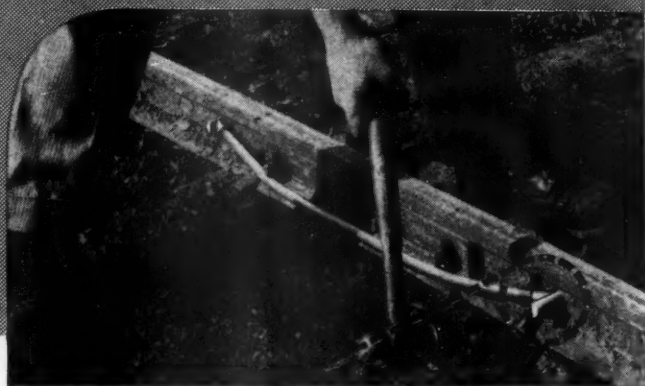
**SELF-POWERED
HAULING EQUIPMENT**

For EARTH ROCK COAL ORE

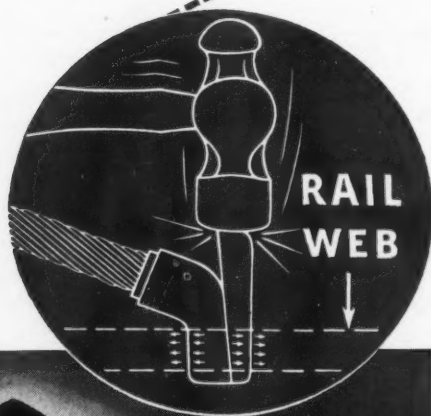


LET THE *Power of Wedge Action*

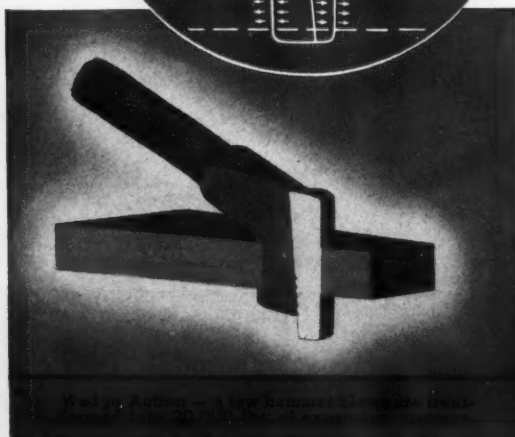
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✻ Editorials ✻

JULIAN W. FEISS, Editor

December, 1946

LEGISLATION FOR INDUSTRIAL PEACE

AS PARALYSIS creeps over the nation and the lights grow dim in our city streets, the public is beginning to realize for the first time the menace of the uncontrolled union, the power of the Frankenstein monster created by a past government policy devoted to political expediency.

The curbing of this power is not going to be easy but the next Congress will have to face this issue as soon as it convenes. Senator Ball in his St. Louis address of November 14 stated that the provisions of the Case Bill had been thoroughly studied and could be reintroduced for hearings as soon as Congress reconvenes. In emphasizing the importance of changes in existing law to protect the rights of all concerned—employers, employees and the public—Senator Ball indicated four general approaches to the problems of labor relations:

1. That Federal mediation be set up to encourage the maximum of peaceful settlement in labor disputes. Here the five-man mediation board and 60-day cooling off period provided by the Case Bill offers a possible solution.
2. That the responsibilities and obligations of union and employers be equalized. This would require revision of the Wagner Act. Among other things, supervisory employees should be recognized as representatives of management and unions should be made legally responsible for violation of their contracts.
3. That individual workers and minorities in unions be protected from coercion by union leaders. Here Senator Ball feels that the simplest, most direct and most truly liberal answer is to outlaw the closed shop.
4. That a solution be sought to the problem of industry-wide collective bargaining with the ever-present possibility of industry-wide strikes. Senator Ball warned against compulsory arbitration but indicated that application of the anti-trust laws to industry-wide shut downs might be a solution.

It is most unfortunate that union leaders cannot see the handwriting on the wall. This is the very act in the drama where wise labor leadership should enter upon the stage and offer in a statesmanlike manner a constructive program directed towards industrial peace. Unfortunately this will not happen. Labor leadership will not surrender any of its special privileges, it will fight to the finish, and leave to the people through their chosen representatives the task of curbing the power which unions have so arbitrarily abused.

In all probability we have seen the labor union at the zenith of its power in this country. Labor leaders have strutted across the contemporary scene with an arrogance not unlike that of certain now defunct European dictators. They have challenged the right of the Federal Government, held their privileges above the law and by the use of political action committees they have attempted to dominate our political life.

A British statesman, Lord Acton, once wrote, "Power corrupts, and absolute power corrupts absolutely." We have seen proof of this dictum and if the coal strike has accomplished nothing else, it has at least aroused the nation to the peril of group control over our economic life. Congress will now insist through legislation that labor unions assume their responsibilities to the government and to the people.

MORE PAY FOR LESS WORK

THE DECISION of the Supreme Court in the Mt. Clemens Pottery case rules that activities of employees such as changing clothes, receiving work orders, procuring tools, and walking or riding from the point of reporting to the working places and return are working time and therefore compensable.

Since this decision, industry has been threatened with retroactive claims in suits for violations of the Fair Labor Standards Act. As this Act was passed in October, 1938, the sums involved in many cases can be astronomical. Suits in New Mexico against the potash companies have already been filed and the Dow Chemical Company of Michigan has settled travel time pay claims retroactive to September 1940 to the extent of over \$4.5 million. David Clarke, general counsel for the National Metal Trades Association, recently stated that the potential retroactive liability in one steel company alone was \$25 million, approximately one-half its capital assets.

Bankruptcy will stare many firms in the face if this situation continues. The trend toward payment of wages for unproductive work can wreak havoc to our economy. Legislation such as the Gwynne bill, establishing a short-term statute of limitations and protecting employers against retroactive application of changed interpretations appears to be the only hope of protection for industry.

Further, we need a definition for work-time under the Fair Labor Standards Act. One definition that has come to our attention appears worthy of consideration: "Work" includes all activities and duties required by the employment contract or arrangement but shall not include any incidental duties before or after work, nor travel to and from work which may involve duties if such incidental duties or such travel are excluded from compensable work by industry practice or agreement."

The editor admits that there are certain Utopian aspects to this situation that have a personal appeal. He would appreciate compensation for eating his breakfast, for changing a tire enroute to the office and what would be more delightful than drawing pay for time spent over a glass of beer at the end of work on a hot summer afternoon in Washington.

Shaker Conveyors for Block Caving

By ROBERT W. THOMAS

General Manager
Kennecott Copper Corporation
Ray Mines Division

The Application of Coal Mine Practice in Conveying Has Proven Successful at This Arizona Operation

IN 1939 the Ray Mines Division of the Kennecott Copper Corporation made a study as to the possible savings in development costs by the mechanical transportation of ore on the mining sill. At that time it was faced with the future mining of a considerable tonnage of ore which was not amenable to the block caving grizzly method then in use throughout the mine for the following reasons:

First, the values were in a badly altered talcky schist which had a tendency to pack when broken, resulting in a chimneying effect when drawn. This meant that the draw points had to be spaced as close together as possible.

Second, and all important, was that

the ore silled on a badly altered barren igneous rock known locally as amphibolite schist. This latter formation was very unstable and had a tendency to swell, with the result that weight on the mining level above was immediately transferred to the motor haulage drifts below, making it impossible to keep them open.

It was therefore necessary to adopt some system of ore transportation on the mining level that would permit the establishment of the motor haulage collecting drift outside the area being mined.

In the early days of mining operations at Ray similar areas were mined by a so-called hand tramming method—the ore was drawn into cars of ap-

proximately one-ton capacity and then trammed to a central raise outside of the area being mined. This method, aside from being inefficient, was economically unfeasible due to ever-increasing labor costs. Thought was therefore given to mechanical transportation. Attention was first directed to slushing, a practice which had come into common use during the previous ten years and which was being used with a great deal of success in many mines. The character of the ground at Ray, however, was such that it would be impossible to maintain an extraction drift of sufficient height and width to permit of the economic use of slushers. It was also felt that slushing would not permit of a uniform draw which is so essential to satisfactory extraction, particularly in areas where the ground is soft and has a tendency to pack. Consideration was also given to belt con-



Steel Aprons Prevent Pan Damage by Large Rocks



The Power Unit Uses a "Long Arm Drive"

veyors, but this method was considered impractical in extraction drifts requiring a great deal of repairs.

Attention was eventually directed to coal mining where much progress had been made in the mechanical transportation of coal, and consideration was given to the use of shaker conveyors which were being extensively used in coal mine practice. It was finally decided to purchase one shaker unit for experimental purposes, and the order was placed in August, 1939. The unit was received in October and by the end of the year sufficient information had been obtained to warrant a block test. The mine now has 20 units, 16 of which are in continuous use, and has produced with the shakers a total tonnage somewhat in excess of 4,000,000 tons, and at the present time is producing by this method approximately three-quarters of a million tons per year.

Mining Blocks Reduced in Size to Permit Use of Shaker Units

There was no change in the mining method other than to reduce the size of the blocks to meet the limitations of the shaker units being used. At Ray the ore is developed in panels, each panel being mined by blocks. In the grizzly system a panel is approximately 200 ft. wide extending across the width of the ore body. Drawing blocks are usually 200 ft. by 225 ft. In the shaker areas the panels are 150 ft. wide and the blocks 150 ft. by 100 ft. In the grizzly sec-

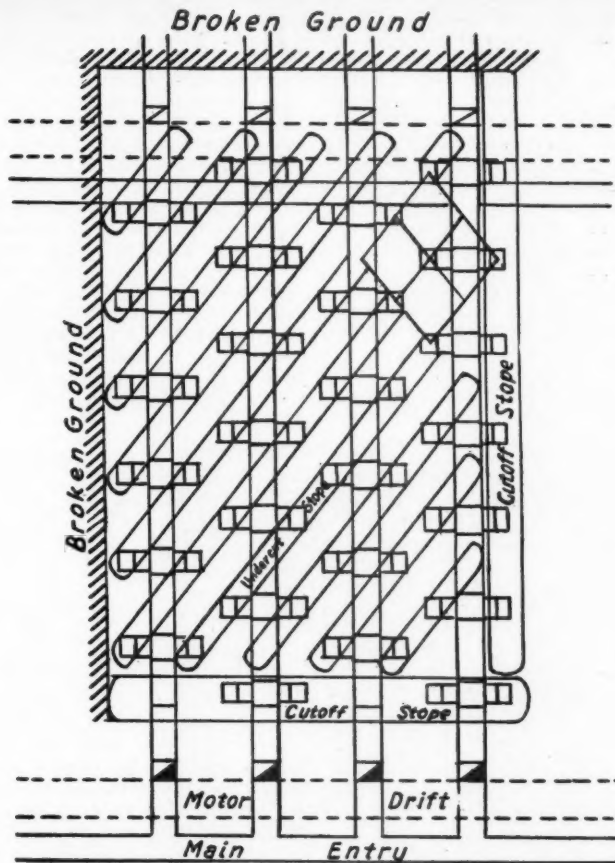


Fig. 1

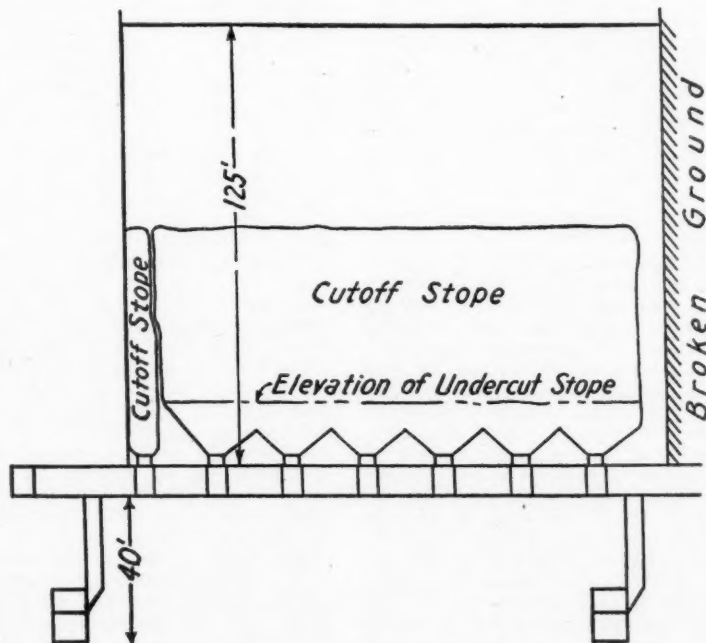


Fig. 2

tions the ore is drawn directly from the draw points onto a grizzly, and passes through the grizzly directly into a raise leading to the haulage drift below. In a shaker section the ore is drawn directly onto the pan which conveys it to a central dump connecting with the haulage level. Fig. No. 1 is a plan of a shaker block. Drifts are spaced on 25-ft. centers and draw points along the drift at 20-ft. centers. Undercutting is done entirely by stoper machines and consists of shrinkage stopes of small height spaced at approximately 13-ft. centers. The undercut stopes are carried diagonally across the block as this has the effect of bringing the undercuts closer together, and assists in making the undercut complete. The draw points are staggered in alternate drifts to accommodate the diagonal undercut. After drawing operations are completed from the regular positions auxiliary draw points are installed out of the back of the drift between the original draw points so that ultimately a draw point is established at the corners of $12\frac{1}{2}$ -ft. squares. As mentioned previously this ground requires a close spacing of draw points and a

trial was made with the draw points spaced at 10-ft. intervals along the drifts. The result of this experiment was that the increased cost of timber repairs, together with the added cost of additional draw points, more than offset the gain in extraction. Consideration was also given to the spacing of draw laterals at 20-ft. centers, but this was abandoned after the unsuccessful results obtained in the closer spacing of draw points along the laterals. Fig. No. 2 is a section through the block parallel to the draw lateral, and shows the cutoff stopes. Fig. No. 3 shows the draw set and drift set now in use. The blocks are cut off on all sides by shrinkage stopes, but after the initial block and panel are completed it is only necessary to cut the block on two sides. The cutoffs are regular shrinkage stopes and the heights to which they are carried depends on the nature of the ground. In the area now being mined, and where the ground caves readily, the cutoff stopes are carried up 40 or 50 ft., and then blasted with a final round which brings them to a width of about 18 ft. The stopes are then shrunk, which permits the back of the stope to slough, thus completing the cutoff. Undercutting is from the solid toward the mined-out blocks and a controlled draw is maintained as the undercutting progresses. This tilts the block of ore, and is very effective in cutting off the capping in the adjoining mined-out blocks. This tilting is also effective in breaking up the block of ore.

Mention has been made that the size of the blocks was controlled by the limitation of the shaker units being used. This limitation was determined in actual practice. The first panel developed was 200 ft. wide, being the same width as used in the grizzly system. During the initial part of the draw no difficulty was experienced, but as drawing operations continued the weight on the timber sets disturbed the sill of the drifts, making it impossible to keep the pan on a uniform gradient and resulted in overloading the unit. By reducing the panel width to 150 ft. this difficulty was overcome and 150 ft. was adopted as the standard width for a shaker panel.

Shaker Conveyors Unusually Suited to Heavy Ground

Extraction drifts are timbered with 12 in. x 12 in. timber sets approximately four ft. wide and seven ft. high in the clear and on five ft. centers. The dimensions of the timber set are held to the minimum size in which the mucking machines used in development can be operated. After the drifts are completed draw points are installed as shown in Fig. No. 3. All muck from this work is handled by a mucking machine. When this

work is completed chutes are put in, the conveyors installed, and the block is then ready for undercutting and drawing. To control the load on the pan two steel angle shaped aprons are fastened under the opposing chutes, thus giving a hopper effect. These aprons are removable and are transferred from one draw point to another. Several changes have been made in the design of these aprons. In the first instance they were made of wood, then of conveyor belt, and lastly of steel. With the former type of apron it was necessary to provide a small portable grizzly. This was made of 35-lb. rail and of a size that

The shaker conveyor is probably more suitable to heavy ground conditions than other types of mechanical transportation. Broken posts and swelling ground in the sill which would handicap other means of mechanical transportation do not interfere with the operation of the pan unless conditions become extreme. When it is necessary to make repairs to a drift set a section of the pan is removed and the remainder of the drift on the dump side is still available for draw. In changing top lagging a platform is installed above the pan and this work accomplished without interfering with operations. The

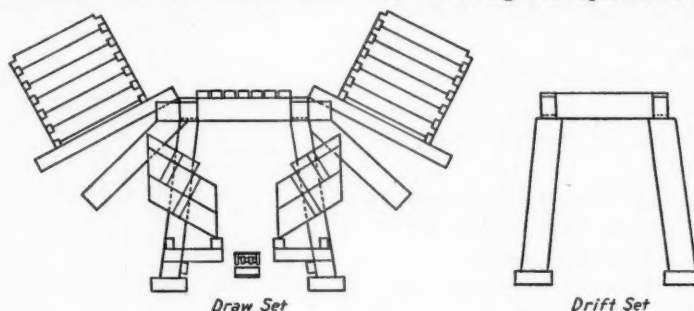


Fig. 3

permitted it to be supported by the chute bottoms of the opposing chutes at a point about 18 in. above the pan. With the steel apron this grizzly has been replaced by welding longitudinally to the aprons a three-in. angle which acts as a grizzly and prevents large boulders from dropping into the pan. This combination of hopper and grizzly is shown in Fig. No. 3. The loading of the pan is controlled entirely by the length of the hopper. With the width of the chute opening used at Ray the correct overall length of the hopper has been found to be eight ft. The chutes are provided with wooden gates so that the flow of muck can be shut off when the aprons are moved from one draw position to another.

In the early operation of the shakers considerable time was lost due to the raise becoming full without the tapper's knowledge. This not only created a spill at the raise but for a considerable distance along the pan line, and also resulted in overloading the unit. This difficulty was overcome by placing a steel plate suspended on a pipe across the top of the raise. As the raise becomes full the steel plate is deflected by the muck, which actuates a mercoid switch which cuts off the power to the unit and at the same time cuts in signal lights on the haulage drift below as well as over the unit on the mining level. These lights signify to both the tapper and the haulage crew that the raise is full.

muck developed while changing the top lagging is caught on the platform and is then dropped onto the pan through an opening in the platform.

Costs Favor Shakers at Ray

It is with some hesitancy that the subject of costs is approached for, although pan conveyors have been in use at the Ray Mines for a period of six years, it has only been recently that the operations have been more or less standardized. To illustrate, the following lists some of the changes made during this period:

In the first instance it was decided to support the pan on wheels running on the original 18-in. gauge track used in the development of the drift. This proved unsatisfactory as spill, which is difficult to control, built up on the rails. To overcome this, short sections of rail were used which were installed at an elevation considerably above the sill of the drift. These, however, proved unsatisfactory for the same reason. The pan was then supported by ball races developed by the manufacturer, but these proved unsatisfactory from a maintenance standpoint. In an attempt to overcome these difficulties the pan was then supported by chains fastened to the drift caps. This also proved unsatisfactory as the movement of timber due to weight made it impossible to keep the pan in proper alignment. The present method of supporting the pan, shown in Fig. No. 3, has proved very satisfactory and at

the present time can be considered as standard. The shaker unit used at Ray is driven by a 15 hp. motor, and this size unit was adopted because it could be transported to any part of the mine without any changes being made in the size of the standard mine entries. The pan used is in 10-ft. sections, and approximate dimensions are as follows: Width at top 24 in., bottom 11 in., depth 6 in. The original units were equipped with a motion designed for moving a maximum tonnage. With this motion the pan when normally loaded carried approximately 70 tons per hour. It was found that this motion with the above load was too severe, and resulted in excessive breakage both in the units as well as in the pan connections. To correct this situation the manufacturer recommended another motion which they described as softer. This motion reduced the normal carrying capacity of the pan from 70 tons per hour to approximately 64 tons per hour, and reduced the breakage in the units and pan lines without in any way affecting the overall production. The original units purchased were so designed that the pan passed over the unit before discharging. This made it necessary to install the unit on the far side of the raise and close to the drawing block, and also required that the unit be installed in a pit. The depth of this pit was approximately two ft. below the regular sill, which was unsatisfactory from both an installation and a maintenance standpoint. It also required special timbering for the unit station, which, due to its close proximity to the drawing block and the extremely long posts required in the station, made it difficult to maintain. To overcome this difficulty there was developed locally what is known as a "long arm drive." This permitted the installation of the unit on the drift sill in a station approximately 10 ft. further away from the area being drawn. The elimination of the pit made it possible to design a unit station with shorter posts, which reduced timber repairs considerably and made maintenance and installation work on the unit much simpler.

All the above changes have increased operating and maintenance costs, and, as mentioned before, it is with some hesitancy that the subject of costs is approached.

The following costs cover operation and maintenance of the shaker conveyors, and are based on an average of costs over the past three years:

	Cost per ton Cents
Pans and liners	0.75
Installation and operation ..	2.18
Maintenance	4.27
Power30
Total	7.50

The item "Pans and Liners," it is felt, needs no comment. The item "Installation and Operation" not only includes the installation of shaker equipment in a new block but also includes the cost of its removal from old blocks. The actual operating costs consist of one mechanic and helper on the day shift only, equivalent to approximately 0.75 cents per ton. The item of "Maintenance" includes all repairs to pans, pan supports and the shaker units, as well as expenses in connection with changes in equipment. Due to the many changes mentioned above it is felt that the overall cost for the three-year period is high, and it has been estimated that the future cost of all

time is required for cleanup. This has some effect on the overall efficiency and actual labor costs for drawing only, excluding all other items, from experience at Ray is approximately one cent per ton higher in a shaker section than in a grizzly section. Haulage costs on the other hand are about one cent per ton lower as the haulage crews do not have as many draw laterals to serve. It is estimated that the difference in development costs per ton of ore for the two methods, with an average thickness of ore of approximately 125 ft., favors the shaker method by an amount equivalent to seven cents per ton. From experience at Ray the direct mining costs with either method

A loaded conveyor in operation. Note "long arm drive" from power unit and heavy anchorage. The chute discharge can be seen at the far end of the pan



items will not exceed 6½ cents per ton.

As to actual production costs it is felt that these would be of little interest as operating conditions in different mines, and even in different sections of the same mine, vary so greatly that actual costs, unless one is completely familiar with these varying conditions, mean little or nothing.

There is some difference in the tonnage efficiency of the two methods. From a manpower point of view it is just as easy to draw from a chute onto a pan as it is to draw from a chute onto a grizzly. In a shaker section, however, some time is required to move the aprons from one draw point to another, which is not necessary in a grizzly section, also more

are practically the same under normal conditions, and as the operating and maintenance costs of the shakers is estimated at 6½ cents there is an indicated advantage of ½ cent per ton in favor of the shaker method as compared with the grizzly method for this thickness of ore. With a thickness of ore of 100 ft. the advantage to the shaker method would be approximately 2 cents per ton as compared with the grizzly method. Likewise, as the thickness of the ore increases the costs favor the grizzly method, and it has been estimated that with a thickness of ore of approximately 135 ft. the overall costs for both methods, including development, are approximately the same. As mentioned above, the area now being

(Continued on page 36)

Mechanical Cleaning for Full Seam Mining

Increased Operating Efficiency Underground and Lowered Production Costs Result from Greater Use of Mechanical Preparation

By the Committee on Surface Preparation



COAL mining still is in the process of evolution and as a part of this evolution our concept of mechanical preparation is undergoing a change. To put it another way, our ideas as to what are the functions of mechanical slate separation are broadening and instead of serving a single purpose of improving the quality of coal, we are coming to regard mechanical cleaning as a labor-saving device. As a result of a number of trial operations, which have proven successful, this idea is crystallizing and developing into a marked trend and it seems assured that the future practice will be to put more and more burden on the cleaning plant.

When we operated our mines entirely with hand loading and had no surface cleaning facilities other than picking tables and the open tops of railroad cars, the practice naturally was always to remove as many impurities as practicable underground at the working face. A hand miner had ample opportunity to do this and to do a good job; that is, what was considered a good job in those days when the customer's specifications were not too rigid. Mechanization, however, did not exactly fit into this method of slate removal and one of the early accusations against mechanical loading was that "a machine had no eyes" and therefore could not see to pick out the impurities at the face. This, of course, was true but nevertheless for some years the mechanical loading technique was patterned along hand practices and the early machine operations attempted to load a satisfactory market product into the mine cars underground. With the few exceptions where there were clean seams, this practice was not successful and besides lowering the quality of the coal, slate picking at the face greatly slowed down the operation of the loading unit and con-

sequently restricted its tonnage output.

At first there seemed to be no help for the situation but before long mechanical cleaning was introduced as a corrective. In the beginning, this was not looked upon with favor as it involved an increased investment and an added operating expense. However as the separation processes were improved and functioned more efficiently, it became recognized by the industry that mechanical cleaning was practicable and not too costly and actually prepared a higher quality product than hand picking had been accustomed to produce. This recognition, of course, was not unanimous, but despite the opposition of those who liked to look back to the "Good Old Days," laboratory analysis did prove it to be based on fact.

However, even with this recognition and with the acceptance of mechanical cleaning as a necessary part of mechanized mining, the early technique still more or less followed hand loading processes by removing as many impurities as possible by hand at the working face. This had the objective of reducing the burden of the cleaning plant and as a part of this technique, selective mining was developed. For quite a while, this seemed to be the answer for getting a high mechanical loading efficiency; in fact, it did prove to be the case in certain mines, but there were other mines where selective mining was not applicable and something else had to be done.

The latest development for such conditions has been "Full Seam Mining"; that is, to load underground everything in the entire seam—coal, slate, bone—and make the separation mechanically on the surface. With the high wage rate for hand picking, this is an altogether logical development and it undoubtedly will become

more widely practiced as time goes on. Actually it does not introduce any technical difficulties in mechanical separation other than to increase the burden on the cleaning plant, which can be answered by the simple addition of more cleaning equipment. The function of mechanical cleaning in full seam mining is to reduce coal production costs by increasing the productive time of the mechanical unit underground and by substituting mechanical for hand labor both underground and on the surface. The following account of a mine that recently adopted this method shows some of the practical results obtained:

Full Seam Mining

The mine, operating track mounted mechanical loaders, produces approximately 6,000 tons of metallurgical and steam coal per day of three-shift operation. The seam has about one foot of overlying draw slate and originally there was loaded separately underground about 500 tons per day of mine rock or slate, including falls of roof coal and other coal which had become mixed with such impurities. This mine slate was all sent to the rock dump; later a washery was installed which covered approximately 175 tons per day of steam coal from this "slate."

After a period of experimenting with the necessary changes in underground methods and in the preparation plant, the entire seam, including partings, the usual roof coal, the draw slate and, wherever it came freely, a band of coal overlying the draw slate, was loaded together into the mine cars and sent to the outside. Each car at the loading face was checked under one of the following classifications:

(1) Rock: Material containing less than 10 per cent coal.

(2) Slate: Material containing from 40 per cent to 90 per cent rock.

(3) Metallurgical coal: Containing less than 40 per cent rock.

The cars on coming to the outside were dumped and then material was handled by a slope belt as follows:

The rock (class 1) is crushed to minus 8 in. before going on the slope belt, from where it goes direct to the rock dump.

The slate (class 2) is crushed to minus 8 in. before going on the slope belt, and then to the reclaiming plant bin, where it is mixed with the middlings product from the metallurgical plant and the coal it contains is recovered as a steam product.

The metallurgical coal (class 3) is crushed to minus 8 in. before going on the slope belt and then screen at 3½ in. The 3½ in. over-product is handpicked with pickers concentrating on removal of sandstone, wood and as much of the drawslate as they can get. From the picking table, the plus 3½ in. product is crushed to pass 3½ in. and remixed with the R. O. M. feed. The resultant 3½ in. x 0 in. material is fed to the metallurgical washers.

Note: While it is stated above that all material is crushed to minus 8 in., flat slabs of rock are obtained that are minus 8 in. in thickness, but up to 18 in. in length.

The middlings product from the metallurgical plant is conveyed to the reclaiming plant storage bin, where it is mixed with the "slate" from the mine, and then to the reclaiming washer where a two-product separation is made, which averages approximately as follows:

Steam coal	53.0%
Refuse	47.0%

Based on total material from the mine, the separation is:

Metallurgical coal	74.0%
Steam coal	6.0%
Refuse	20.0%

During the evolution of the present mining preparation methods, it was of the utmost importance to maintain the even quality of the metallurgical coal and this has been attained while realizing also the following advantages:

(1) The yield of the metallurgical coal per acre, as well as of steam coal per acre, was considerably improved. This came about partly from recovering more of the seam, or that part that was formerly left underground, and partly because of recovery of both coking and steam coal out of refuse formerly sent to the gob pile.

(2) An increased yield of metallurgical coal per day per unit of

loading equipment per man-shift; all with the same equipment and no changes otherwise.

(3) The production of approximately 480 tons per day of satisfactory steam coal from what was formerly waste material.

(4) This plan has helped the washery operation in producing a better quality cooking coal product.

(5) Increased mine height which permits higher loading of mine cars, prevents coal being scraped off in transit and, in general, improves working and mine conditions.

(6) In general, mining conditions were also considerably improved, as it was found possible, due to the better working conditions, to get better gob falls because of the cleaner extraction, not only of the coal that was formerly left in place, but also because less is left in fenders and stumps.

(7) Improved safety, due to no longer having overhead a weak, treacherous, draw-slate supported on

cross-bars and underlaid by 8 in. to 12 in. of head coal.

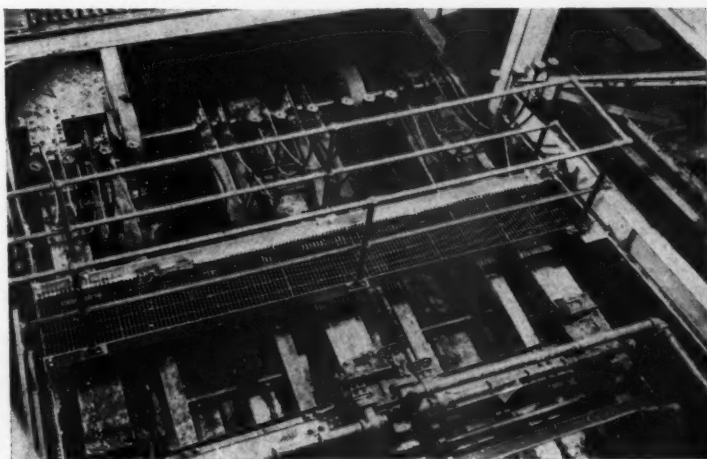
(8) Better overall costs due partly to less timbering, but mainly due to the improved washed coal yield per man and per unit.

Future Studies

At a recent meeting held jointly by the Committee on Surface Preparation and the Committee on Mechanical Loading, it was the consensus of those present that the coal industry must develop all types of mechanization to their fullest extent. High labor scales prohibit the extensive use of hand methods and this applies especially to hand picking in preparing coal for the market. Full seam mining, where it can be practiced, is a means towards cost reduction; the problems involved effect both the underground as well as the tippie operations and these two committees are now preparing to proceed jointly in a study of this important subject.



Full seam mining requires adequate surface preparation facilities





Diesel Locomotive for Underground Haulage

IN THE Treasury Tunnel of Idarado Mining Company, located at Ouray, Colo., elevation 10,600 ft. diesel locomotives have been used on the main line underground haulage for more than one year now, and with very gratifying results.

Treasury Tunnel is now in about 13,000 ft. from the portal. The first 5,000 ft. is of old time construction, and is narrow and steep, with grades in places up to nearly 2 per cent. Due to the low back in this first portion of the tunnel, it appeared dangerous to install an electric trolley for haulage purposes. After much discussion, and after having received written permission from the Commissioner of Mines of Colorado, it was decided to try out a diesel locomotive on the main line haulage. A new conditioner for controlling the gases from the exhaust had recently been perfected and after looking into this very important item, we were convinced the use of the diesel underground would be safe and reliable.

Our present diesel has a weight of approximately six tons and a rating of 65 hp. Mine track is of 45-lb. rail and has a 24-in. gauge. Granby type cars of 60 cu. ft. capacity are used in the ore haulage. Treasury Tunnel at present is a dead end and will be until connection is made with the old Black Bear working 1,100 ft. above. Ventilation at present is through an 18-in. pipe line, with large suction fan located at the surface and a booster fan installed in the circuit

The Idarado Property has Pioneered with Underground Diesel Haulage and in the Elimination of Exhaust Hazards by Use of a Gas Conditioner

By C. W. PLUMB
General Manager
Idarado Mining Company

at 8,500 ft. in. Five thousand cu. ft. of air per minute is handled to the headings.

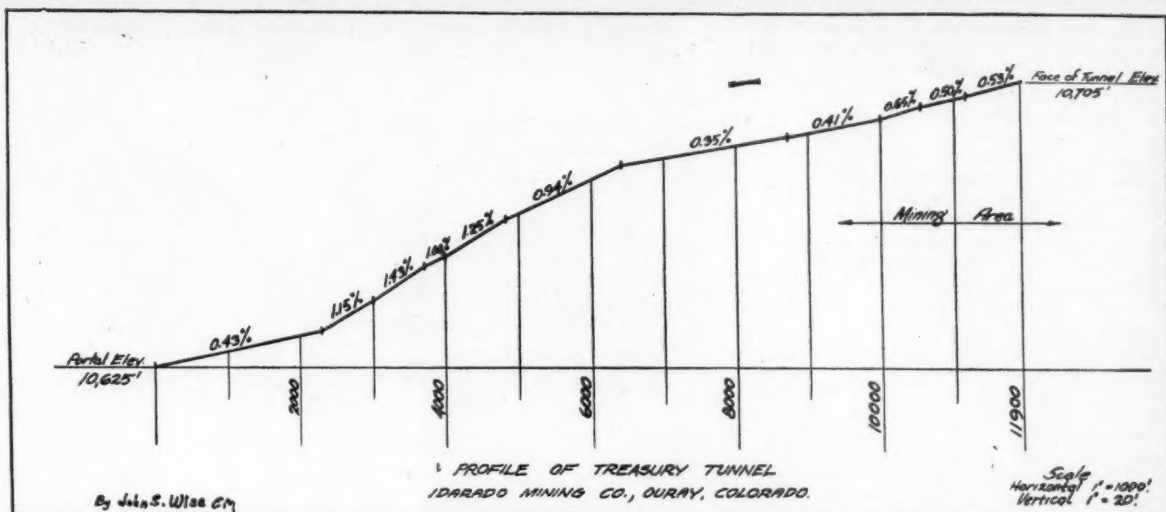
Our six-ton locomotive is somewhat small for our present requirements, as it is capable of pushing only 16 to 17 empties back into the mine. We need a diesel capable of handling 20 empties over our unusual high grades and contemplate the purchase of an eight-ton diesel locomotive in the near future.

We have been well pleased with the use of the diesel on our underground haulage and can state that so far as gases are concerned, they have been negligible in our entire use of the locomotive. We have had some mechanical troubles but these have been overcome quickly. These troubles have been almost entirely due to war time material used in the construction of the locomotive. As to the use of the diesel in underground transportation, i.e., as to safety, flexibility and to economy of operation, we are very much pleased and can highly recommend it.

Diesels Have Been Used in Europe

Comparison of our locomotive with European practice is of some interest. Diesel locomotives have been used underground in Europe and England for some time. Germany seems to have been the principal country where diesel mine locomotives were manufactured.

One of the locomotives installed in the King Hill Mine in England seems to be the closest for comparison with our operation. This locomotive is operated on a 350-ton mile basis in seven hours with a slight grade in favor of the load. It is required to pull in 50 empty one-ton capacity cars against a 1.2 per cent grade. The drawbar of the locomotive is 2,700 lbs. and the weight of the locomotive 10 tons, the hp. 45 to 50. The small horsepower and comparatively greater weight of locomotive compared to ours, stems from the fact that the diesel engine used is slow speed, approximately 1,000 rpm., as compared to our diesel



engine, which develops 65 hp. at 2,200 rpm. Our locomotive when it arrived, approximately a year ago, was five ton and we have added an additional ton, making six tons of weight on the drive wheels. The Buda engine develops 65 brake hp. and with the $1\frac{1}{2}$ per cent loss per 1,000 ft., due to altitude, the motor is capable of developing at the Treasury Tunnel 55 hp.

Under actual working conditions 120 loaded cars have been brought out in one shift of eight hours from a distance of two miles. On individual trips as many as 26 empty two-ton cars have been pushed in. On the

basis of 100 cars per eight-hour shift from the two-mile switch, 500 ton miles of loads are brought out and 200 ton miles of empty cars are pushed in, making a total of 700 ton miles gross per eight-hour shift.

It is practically impossible to compare operating costs between our locomotive and those used in European practice as we do not know the wage scale, prices and other operating factors. However, if one wishes to calculate our costs it could easily be done in the following manner:

In an eight-hour shift we can handle 120 cars that hold three net tons of ore. This ore is hauled a distance of two miles from the chutes to the mill bin. The transportation labor involved for this consists of two men—the diesel operator who receives \$1 per hour and the brakeman, who receives 94 cents per hour. Fuel oil consumption on an eight-hour shift is

about six gal. This costs us 10 cents per gal. In addition, there is a small charge for lubricating oil and greases.

Exhaust Gas Difficulties Were Overcome Successfully

At Idarado we have 2,300 ft. of grade of the 13,000 ft. of total haulage distance averaging $1\frac{1}{2}$ per cent and 400 ft. of this 2,300 ft. is substantially 1.8 per cent grade. When figured on the basis of 20 lbs. per ton gradient resistance and 20 lbs. per ton train resistance, it makes a total of 56 lbs. resistance per ton going over the ruling grade of 1.8 per cent. The drawbar necessary to push in the 26 empty cars is, therefore, 2,912 lbs. This figure may be low since pushing cars in the tunnel has a tendency to make them slantwise with the track, giving high flange resistance on each individual car, which would not occur



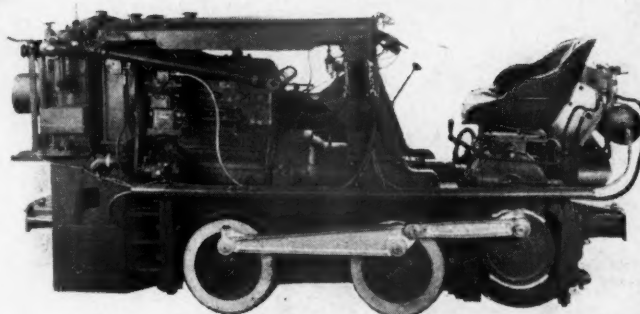
Using the diesel, 120 loaded cars have been hauled in one shift



Three-ton Granby cars haul ore two miles from chute to ore bins

if the cars were drawn in; safety requirements of our operation precludes this. On this grade the locomotive operates in intermediate gear, that is, the gear below high of the four speed transmission, and under this extreme load and long distance, the exhaust gas conditioner, which was entirely satisfactory for the normal $\frac{1}{4}$ to $\frac{1}{2}$ per cent grades, proved inadequate. A new conditioner was developed at the instigation of Mr. Fred Jones, Commissioner of Mines for the State of Colorado, which would dissipate satisfactorily the maximum amount of heat produced upon this grade.

The problems of exhaust gas conditioners are numerous. Since the exhaust is laden with unburnt fuel and lubricating oil which issues at high temperatures under extreme loads, and where the loads are prolonged, the difficulty of dissipating the heat on a conditioner sufficiently small to be carried by the locomotive is an acute problem. All conditioners require that there be an intimate comingling of the water with the exhaust gas. There also must be at all times sufficient water available to dissipate the heat so that the exhaust issues at a temperature at least equal to that of boiling water and preferably below, since many of the irritants formed by the exhaust gas of a diesel engine come into being when the diesel exhaust contacts the oxygen of the air at high temperatures. The temperature drop being affected by the high latent heat of evaporation of water, namely 960 B.T.U.'s per pound of water evaporated. A conditioner was developed which would hold 4 cu. ft. of water, and circulate the water together with an efficient diffusion of the exhaust gas in the water with a relatively low back pressure. The exhaust gas enters the manifold of the conditioner and tubes conduct the gas below the water level. After the first introduction of exhaust gas, circulation of the water throughout the entire conditioner is affected at a substantial rate. The discharging of the exhaust gas into this upwardly circulating volume of water has a tendency to shear the bubbles of exhaust gas and make them quite small. However, the diffusion must not be so great as to preclude the separation of the water from the gas when it arrives in the upper separating chamber. This is controlled by both the velocity of the water and the diffusion tubes size. A semi-spitz kasten in conjunction with a series of baffles separates out the bulk of the water in the separating chamber. Above this chamber is a secondary chamber wherein the exhaust issues to the atmosphere free of any particles of water and returns the centrifuged water back into the circulating

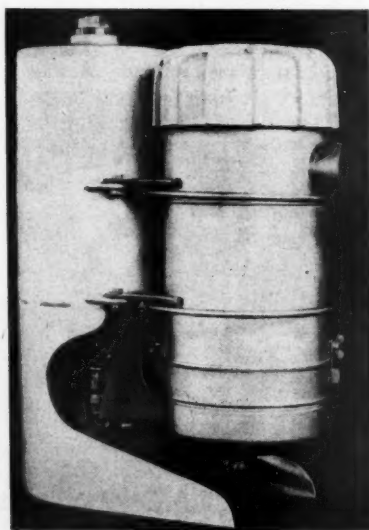


The present locomotive has a weight of 6 tons and a rating of 65 h.p.

stream. Proper facilities are available to rod out the diffusion tubes, which due to the low drop in temperature accumulates the waxes, oils and carbon of the exhaust on their inner surface. Servicing of this is simple and is required about once a week. This conditioner operates more efficiently under a load since with the rise of temperature of the water, the increased vapor pressure of the water dilutes the gas more completely. The exhaust from the locomotive virtually becomes an exhaust of steam which condenses after it issues. The condensation precipitates all of the solid particles that would remain in the air in the colloidal state were it not for the moisture that has been mixed with the hot gases. The conditioner, therefore, takes out the smoke and reduces the obnoxious exhaust to a minimum.

The locomotive frame is cast steel,

the fuel tank is combined with the cooling water tank and is of rolled fabricated steel, $\frac{3}{8}$ in. thick. Headlights on front and rear and the overall height is 4 ft. 6 in., the overall length is 12 ft., the overall width is 39 in., the gauge, as stated, is 24 in. The locomotive is equipped with front and rear midget type automatic railroad couplers. The journal bearings are supported on extra long springs, made of special chrome vanadium alloy, having a free length of $8\frac{1}{4}$ in. and a loaded length of $5\frac{1}{2}$ in., which gives the locomotive good roadability on rough, uneven track. Our track, however, has been materially improved in the past year. The wheels are rolled steel manganese alloy, shrunk on counter balanced hearts and after a year of heavy service, much of it two eight-hour shifts per day, the tires show slight wear. European locomotives on the same duty wear out a set of tires in one year.



The fuel and cooling water tank are combined

Traction and Braking Problems Were Solved Efficiently

The ability of a locomotive to use every pound of its weight in effective drawbar depends upon the two axles moving in unison. This can only be accomplished with the familiar side rod so common in railroad practice. It is well known that the slightest slip materially reduces the locomotive's tractive effort. With side rod drives, slippage can only occur when the locomotive exceeds the tractive effort of its maximum weight. The German locomotives use side rod drives to the exclusion of all other methods.

Locomotive wheel slippage is brought about primarily by high torque peaks. On the average steam locomotive with eight functioning cylinders, the torque peaks must be necessarily high. However, with the diesel locomotive geared to 50 revolutions of the engine, to one of the drive

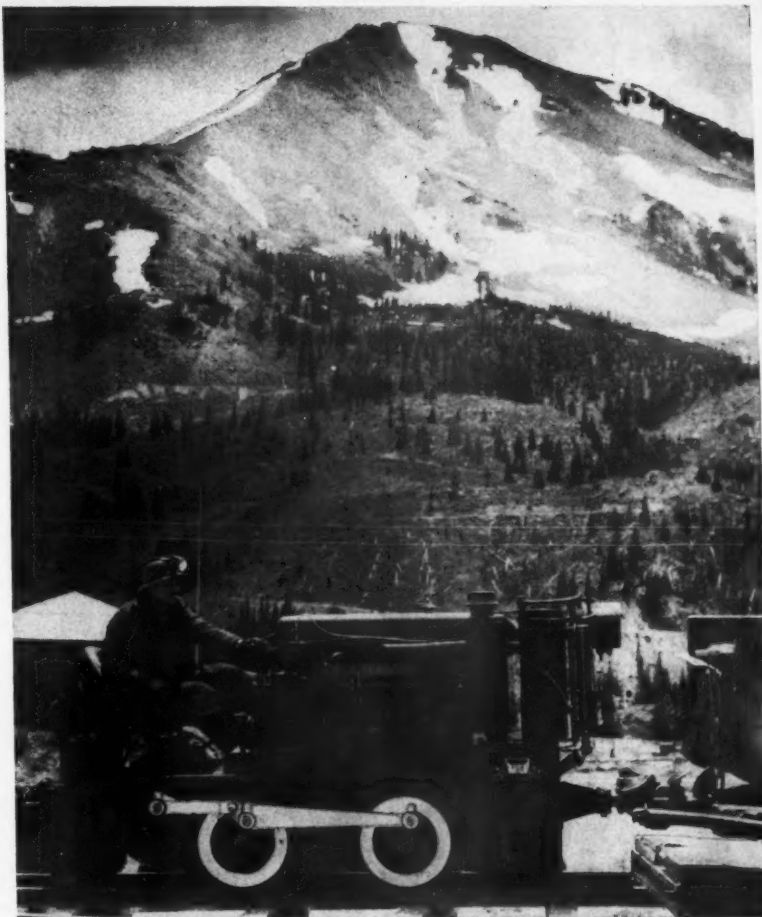
wheels, it is clear that there are 25 torque peaks for each revolution of the wheels when starting the load. This is particularly valuable since it is well known that it takes almost twice the tractive effort to start a loaded train than it does to pull the same train when it is in motion. Once the train is in motion, little if any slippage occurs on the working load unless the track becomes wet, in which case sand must be added.

The locomotive is equipped with Westinghouse air brakes. A Westinghouse compressor is built into the engine by the Buda Company at their factory. The compressor is force-feed lubricated from the engine system and cooled by the engine cooling water and is equipped with an unloader that keeps the pressure at 125 lbs. Due to the high humidity that exists in all mines, it is necessary to equip the receiving tank with an automatic drain which bleeds the water from the tank at intervals, furnishing dry air at all times to all the brakes. The air brake valve is self-compensating and graduates the pressure throughout the quadrant range, increasing or decreasing the pressure applied to the brakes with accuracy. The brake cylinders are equipped with quick release valve that releases them in the shortest possible time after the valve is closed. We have found that greater loads with greater safety could be hauled out by using an extra brake car which is equipped with air brakes and serves as transportation for the bosses and is affectionately called the "Silver Slipper."

Additional equipment such as tachometer, ammeter, magnetic switch, push button control, are furnished and the locomotive uses 12 volt, 140 amp. type battery, starter and generator. The locomotive starts promptly under normal operating conditions.

Tests when the diesel has been in operation have been made by the U. S. Bureau of Mines on the air conditions in our tunnel. As previously stated, this tunnel is at present a dead end and with its extreme grades, it represents one of the hardest conditions for locomotive operation and for ventilation. Recent tests, dated August 5, 1946, by U. S. Bureau of Mines contains the following sentence, "There was no carbon monoxide present, and only 13 and 17 parts per million, respectively, of oxides of nitrogen present in the atmosphere. This is a very favorable condition as the American Standards Association has set 40 parts per million of oxides of nitrogen as the maximum allowable safe concentration for a combination of oxides of nitrogen."

The locomotive that we are using was manufactured by the Ruth Company, of Denver, Colo. Mr. Joe Ruth, the head of the Ruth Company, has been intimately associated with the



The diesel operates at an elevation of over 10,600 feet above sea level

operation of this locomotive since its installation. Mr. Fred Jones, Commissioner of Mines for Colorado and Mr. McNaughton, mine inspector for the district, made many valuable suggestions in developing the locomotive for use on the Idarado property. As

the safety and welfare of our employees has always been our first consideration, the development of this transportation system was based upon the linking of safety with increased efficiency and this objective has been attained with the diesel locomotive.

Mining Industry Achieves Unique Distinction

IT IS understood that there has never been a survey made to determine the longest word in the English language. Until a short time ago it was thought that "HONORIFICABILITUDINITATIBUS" qualified for the record. The meaning of this word has not been explained but possibly it can stand on its own merit. A word without meaning has many uses, especially for magazine editors.

Recently the staff of a prominent dictionary publishing house learned of a new word which will probably shatter all existing records. The mining industry has the doubtful distinction of contributing this giant of

philology to the language. Apparently the medical profession, in quest of a simple term for a lung disease contracted by miners, hit upon this new word with malice aforethought. Although this word is obviously unfair to organized typesetters, one trusts that their good nature will permit its introduction to the mining industry. This word is: PNEUMONOUltramicroscopicSilicovulcanokoniosis! Nothing has been reported concerning the nature of this disease but if the name is indicative of its symptoms, we hope an antidote is discovered immediately.

Underground Belt Haulage— How and Why? (Part I)

THE primary question that should be asked concerning complete underground belt conveyor haulage is "Why Complete Belt Conveyor Haulage Systems?" The very first consideration in discussing this topic should be—Safety and its relationship to belt conveyor haulage. Derailments, collisions, runaways, falls from roof due to wrecks and leaving of ventilation doors open cause injuries which can be almost totally eliminated with complete underground belt conveyor haulage. One striking example of safety with complete belt conveyor haulage is a record by H. C. Frick of over 60 million tons of coal hauled without a fatality or a major injury. To add to this, I can personally state that I have not encountered a situation wherein a fatality or major injury has occurred during a 12-year period of experience with belt conveyors hauling from butt headings to mine cars or from working faces to railroad cars.

We employ reasonable rules to prevent injuries in the transportation of men and coal over belt conveyors. Close adherence to the foregoing rules and attention to details of operation by both employes and supervisory officials permitted us to mine over 1,000,000 tons of coal without even a minor haulage injury being sustained. However, one cannot assume that belt conveyors can be a cure all in the prevention of haulage accidents in and around coal mines but I will state that when belt conveyors are operated properly they offer a very safe method of transportation for employes or delivery of coal complete from working faces and over outside terrain to railroad cars.

Power saving in complete belt haulage is another important item that cannot be overlooked. We are delivering coal from the face of Bolair No. 1 mine to railroad cars over a network of belt and chain conveyors which have a total center to center distance amounting to more than one and a half miles. Added to this horizontal haul is a vertical lift of 550 ft. which necessitates the operation of some conveyor units over gradients ranging up to 18 per cent against the load. Coal is being handled at the rate of 200 tons per hour over such

Advantages in Operation, Safety and Maintenance are Claimed for Belt Transportation From Face to Tipple

By CLINTON W. THOMPSON

Mine Superintendent
Pardee and Curtin Lumber Co.

grades and total connected haulage load amounts to only 310 hp.

A number of reasons can be advanced for obtaining performances such as noted in the foregoing paragraph and these can be listed as follows:

First—Least tare weight of moving

parts resulting in less total work to be done.

Second—Return of energy by those belts or portions of belts running downgrade. This can be a direct force within a single belt, i.e., downgrade portions of the belt actually pulling other portions or as electrical



Presented at the Annual Meeting of the West Virginia Coal Mining Institute, Bluefield, November 15, 1946.

energy in cases where the entire conveyor tends to drive the motor as a generator.

Third—Performance of the total work to be done continuously resulting in lower peaks of power requirement than is possible by any means which performs the same amount of work on an intermittent basis no matter how well timed.

Computation Shows Definite Saving in Power

Following is a computation of two separate power bills; one shows the power billing for Bolair No. 1 mine and I refer you to the third statement in the preceding paragraph. The other lists Bergoo No. 2 mine which has mine car haulage in a seam of coal with compensating up and down gradients.

Belt Mine—Energy Blocks—70XKVA Demand Bolair No. 1 Mine

44,380 kwh. at \$0.0000 high billing.
44,380 kwh. at .0000 second billing.
44,380 kwh. at .0000 third billing.
122,860 kwh. at .0000 lowest billing.

Track Mine—Energy Blocks—70XKVA Demand—Bergoo No. 2 Mine

59,850 kwh. at \$0.0000 high billing.
59,850 kwh. at .0000 second billing.
59,850 kwh. at .0000 third billing.
60,860 kwh. at .0000 lowest billing.

You will note that total consumed energy at Bolair No. 1 mine amounted to 256,000 kwh. and 122,860 kwh. are in the low billing bracket. However, Bergoo No. 2 mine shows 239,610 kwh. with only 60,860 kwh. being in the low bracket. I will again refer you to the third statement mentioned in the foregoing paragraph. Incidentally, both computations are for the same power billing month and both mines operated the same number of days and produced approximately the same tonnage. However, Bergoo Mine No. 2 hauls coal down grade to tippie and Bolair lifts coal 550 ft. vertically. I have not endeavored to compile an estimated report on just what the power consumption would be if we had to rely on mine cars with either trolley or rope haulage facilities or a combination of both at Bolair No. 1 Mine. It is felt that the following statement suffices for a given amount of effective transport work, i.e., moving a given number of tons a given distance plus or minus a given change in elevation the belt conveyor haulage system has proven to us, with our particular mining conditions, to be much more economical insofar as power consumption is concerned.

Operating labor cost should be taken into consideration whenever "Why Complete Underground Belt Conveyor Haulage System?" is being discussed. Figures ranging from \$0.030 per ton for belt haulage to \$0.080 per ton with mine car haulage have been produced from studies made by different people. We find that our haulage operating labor cost is usually approximately \$0.015 to \$0.035 per ton with belt conveyors. Our Bolair No. 2 Mine has a complete belt mining system with the haulage labor cost amounting to slightly less than \$0.010 per ton. Elimination of men at transfer stations, e.g., where one belt conveyor loads on the tail of another to provide continuity of coal flow over a number of self-contained intermediate units, enables us to control an important phase of our haulage labor cost. Such men are eliminated by the use of positive electrical control methods which will be described later in this paper.

Freedom from Interruptions an Important Advantage

Three additional items worth mentioning while still discussing "Why Complete Belt Conveyor Haulage?" are freedom from interruption, continuous flow and freedom from grade restrictions. It is felt that we should

agree at the start that the belt itself is essentially fragile in some respects, particularly edge wear and tearing but, that in spite of this, the belt conveyor is more reliable and results in less lost time than any other haulage method. The lost time due to belt troubles is a matter of one to two hours per year on the Frick Colonial system. In another case lost time due to belt delays was .4 per cent of the total operating time. In all cases of normal belt failure there is long advance warning in the appearance of the belt of approaching trouble and repair or replacement can be scheduled to avoid interruption. According to our records at Bergoo No. 2 Mine we have not had a delay on our belt system since the belt conveyors were installed about a year ago.

We have just stressed the points pertaining to the item "Freedom from Interruption." We will now discuss "Continuous Flow." The continuous performance of effective transport work mentioned under power savings provides additional advantages both at the receiving end and delivery end of the conveyor, first in avoiding any delay in removal of coal behind the loader and finally in delivery to screens continuously rather than in batch lots. Such methods of constant flow makes it possible for us to enjoy loading machine performances whereby loading time has actually amounted to 66.7 per cent of total operating shift. There are times even in the most efficiently operated mine car haulage systems when due to irregular dispatching or other causes, mine car supply becomes erratic thus resulting in costly delays at the loading machine. With freedom from interruption and continuous flow, possible with the use of belt conveyor haulage, such delays as just mentioned are almost eliminated.

As compared to track haulage belt conveyor haulage has complete freedom insofar as plus or minus grades are concerned even to the extent of going down in deep swags and over high humps. Run of mine coal is commonly handled on grades 30 per cent plus or minus and on occasions inclines up 35 per cent have been used with only a minor spillage of lumps.

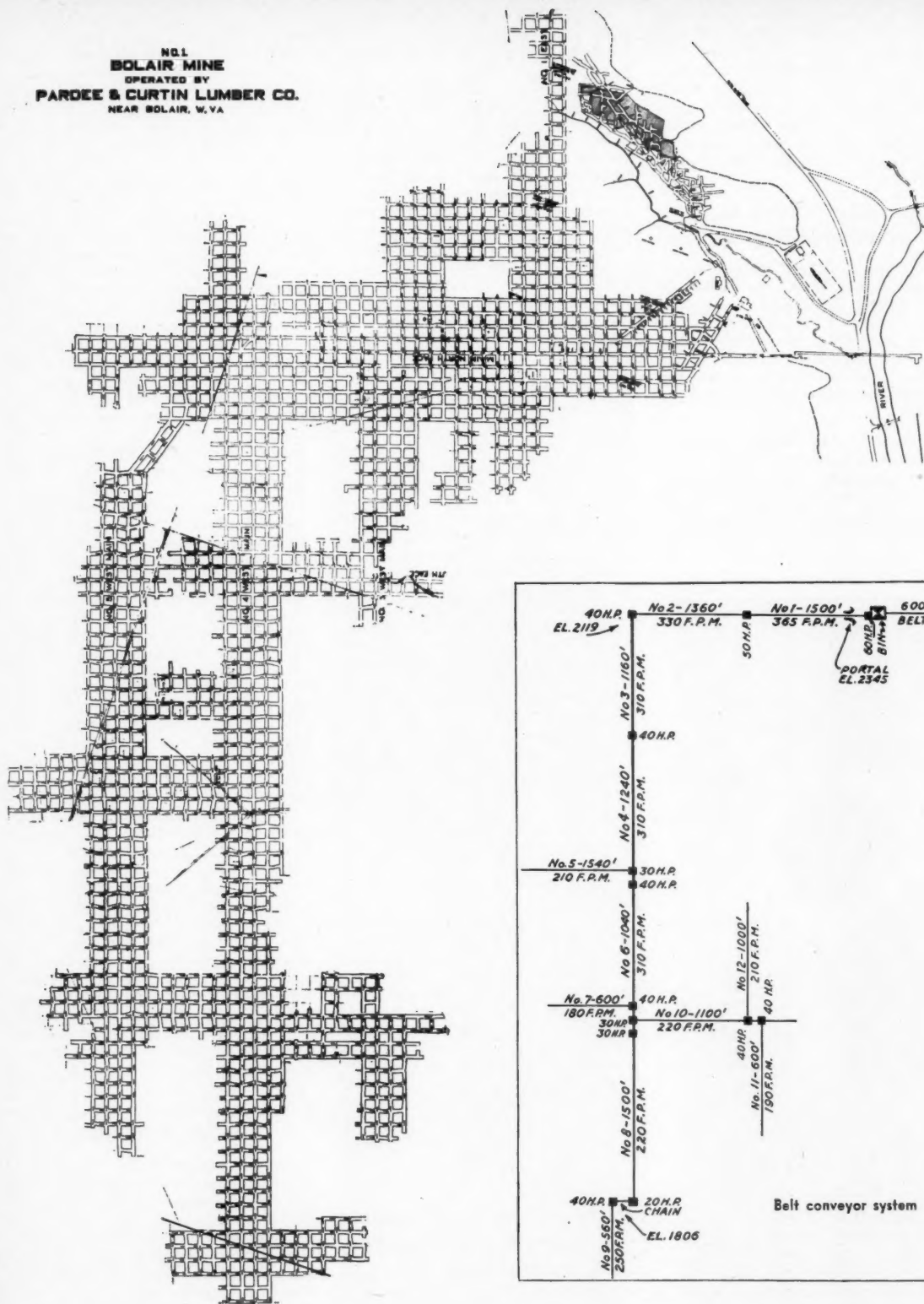
Conveyors Have the Advantage of Flexibility

Complete underground belt conveyor haulage lends itself to any type of mining system since the advent of rubber tired shuttle cars. Block systems with full recovery to partial extraction of most any mining method can be handled with complete belt conveyor haulage. We feel that there is a practical limit of just how far we should go with complete belt haulage in any one coal mine.

We are overcoming one operating



NO. 1
BOLAIR MINE
OPERATED BY
PARDEE & CURTIN LUMBER CO.
NEAR BOLAIR, W. VA.



problem in connection with laying out belt systems to impractical extents. This problem covers the mining of a body of coal consisting of several thousand acres which is in long narrow points and is very inconsistent as to uniformity in height and grades. To simplify the installation we are building a seven-mile outside railroad. Eighty-lb. steel is being used in the construction and 20-ton diesel electrical locomotive haulage will be used together with 10-ton four-axle drop-bottom cars. Three complete belt mines will deliver coal to the 10-ton cars which will be loaded outside through 10- to 20-ton bins.

Tentative estimates reveal that with the combination of outside haulage, 10-ton cars and complete belt haulage we will be able to save approximately \$300,000 in grading underground haulageways. We can salvage the belt conveyors, track and haulage equipment but cannot, of course, move and reuse rock tunnels and heavy top and bottom rock cuts.

Proper Conveyor Design Influences Haulage Efficiency

The correct design of belt conveyors is a very important subject which we cannot afford to overlook in complete belt conveyor haulage. Length of centers in the past has been limited by the practical operating tension of the more or less standard underground belt constructions. With this ceiling on tension established center distance which can be used depends on grade, rate of loading, belt speed and type of drive. Grade makes itself felt in the design of the conveyor by reducing center distance possible in the case of plus grades and by making longer centers practical in the case of declines. One case of favorable grade now under consideration will permit a center distance of nearly 7,000 ft. with an ordinary duck belt. Complex conveyors with both inclines and declines in the same conveyor require careful analysis of tension and power requirements since the probability exists that at times the belt may be loaded on inclines only or on declines only resulting in greater power requirement than for the fully loaded belt.

There is practically no limit on rate of transporting coal by complete underground belt conveyor haulage. The capacity of the common 30 in. belts at various speeds is well known. Capacity goes up directly with speed and as the square of the width. Thus the 60 in. slope belt at the Robena Mine is designed for 2,800 tph., and if anyone wants to handle a greater tonnage still wider belts can be used. The advantages of complete underground belt conveyor haulage are multiplied as increased rates of tons per hour are required.

We have belts operating at speeds as high as 540 ft. per minute in our Bolair No. 2 Mine. We feel, of course, that when employees are transported on belts such speeds are excessive. However, in case of belt conveyors on permanent equipment in slopes and main line haulage where man-trip cars are used on supply tracks, speeds in excess of 600 ft. per minute can be used successfully. It should be noted that in increasing speed as a means of reducing cross sectional load and consequently belt tension, two sacrifices are made. First, with smaller cross section load the pattern of abrasion on the belt surface is less desirable than with full load. Second the power demand per unit of effective transport goes up since power to drive the belt itself will vary directly with speed and no more tonnage will be delivered at the higher speed because of the reduced cross section of load.

With present belts, the power

made without exceeding the cost strength ratio of cotton belts, they are primarily high strength and consequently high cost belts. Therefore, the extension of centers and increase in the size of individual drives by use of such belts, requires a weighing of the increased belt cost against savings in drives and direct and indirect saving by elimination of transfer stations.

In discussing correct design of belt conveyors we should not forget that manufacturing companies are continually developing new ideas in regard to size of idlers, drive rolls, etc., and one company developed a spring tension take up which is incorporated in the drive unit. This is made possible by the addition of one roller installed in back of the wrap drives which has a tendency to take up slack in the belt by spring tension. Take up at the tail end of conveyors is maintained for the purpose of stayability.



A surge bin at the Portal loads the tippie conveyor

which a belt can absorb is limited by the previously mentioned ceiling on belt tension in combination with common belt speeds. Thus, at 400 ft. per minute 60 hp. is about all an ordinary 30-in. belt can absorb. This is true regardless of whether the 60 hp. is made necessary by a substantial grade in a short belt or by extreme center distance with a favorable grade. It should be noted that belts of sufficient strength to absorb 250 hp. in 30-in. width are entirely practical from an engineering standpoint but economic considerations enter strongly into such designs.

New Materials Have Improved Belt Quality


New materials for belts such as treated cotton, rayon, nylon, glass and steel fibers have multiplied the ability of the belt to absorb power from the drive. While these materials may be

Another improvement includes an automatic lock in intermediate sections which joins without the use of bolts. A number of companies are discontinuing the use of small idler rollers and are adopting the 4-in. size.

One coal company has decided to use a belt conveyor with aluminum intermediate sections to decrease labor cost in moving and handling. We are installing a belt conveyor which is of very recent design and I am sorry that I am unable to reveal or describe the new improvements at the present time.

Belt Characteristics Vary with the Mode of Construction

Ply, belt width, top cover together with pulley cover are items which also should be discussed when talking about the correct design for belt conveyors. Cotton belt ducks vary in weight from 28 oz. to 48 oz. based on



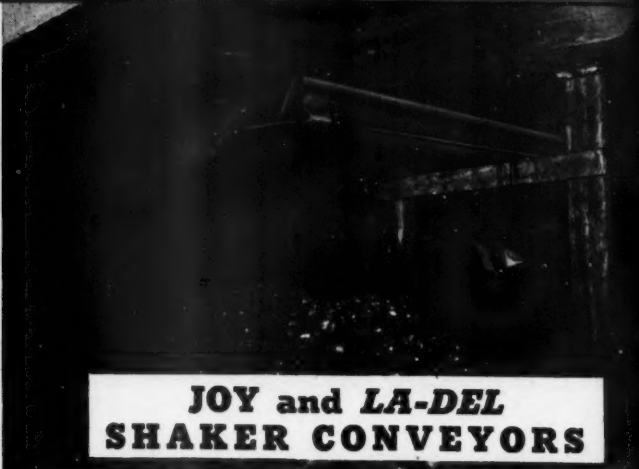
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Spillage can be prevented at transfer points

the lineal yard 42 in. wide. In the common 26-in. and 30-in. widths, it has been necessary to stay within very narrow limits of total cotton content. These limits are a minimum to properly support the load and a maximum which will allow the empty belt to trough. Thus, the three-ply 48-oz. belt which has some acceptance underground and the more widely used five-ply 28-oz. have the following comparative properties:

	Ave. ult. stg. Lbs. per in.	Relative cotton content	
3 ply 48 oz. ...	1,560	(3x48)	144
5 ply 28 oz. ...	1,550	(5x28)	140

It is obvious that these two extremes of ply are really not greatly

different. Other characteristics such as ability to trough, ability to hold fasteners favor one combination of duck or the other to some degree but it is obvious that the limits within which the cotton belt can be manipulated are narrow.

Cover gauge of the carrying side of belts for complete underground use has become common at $\frac{1}{8}$ in. in this country by the necessity of resisting cutting and gouging at the loading point, rather than by abrasion requirements. In England cover gauge is limited by government control of rubber to $\frac{1}{16}$ in. on the basis that their methods are so destructive of belting that heavier covers are not justified. With our $\frac{1}{8}$ in. top cover failure of belt by cover abrasion is so infrequent

that it has become standard to sacrifice $\frac{1}{32}$ in. of abrasive gauge to permit inclusion of breaker under cover. Common pulley cover is $\frac{1}{32}$ in. or $\frac{1}{16}$ in. with the $\frac{1}{16}$ in. favored because of the tendency on some equipment to wear the pulley surface on the inclined troughing rolls which are canted in the direction of belt travel to facilitate training. This places the axis of the roller out of perpendicular with the direction of belt travel and results in continual scuffing of the pulley cover. The benefits in training may outweigh the loss of pulley cover, but the effect should not be disregarded in selecting the pulley cover gauge.

(Part II will follow in the January issue.)

Shaker Conveyors For Block Caving

(Continued from page 23)

mined by the shaker method, due to the physical characteristics of the ground at the haulage elevation, could not have been mined by the grizzly method, and the use of shakers has made possible the mining of this ore at a cost comparable with those of the grizzly method had it been possible to use the grizzly method in this area.

New Experimental Panel Being Planned

It is felt that the mechanical transportation of ore from experience at Ray has a very definite place in metal mining, and with block caving methods is feasible in the mining of thin ore bodies where the thickness of the ore makes the difference in the development costs of the two methods favorable to the mechanical method by an amount greater than the operation and maintenance of the mechanical equipment when the total of all other costs is the same for either

method. It can also be used to meet problems where the character of the ground will not permit the use of the adopted method of mining.

The Ray Mines is now planning an experimental panel in which the shakers will discharge onto a cross belt conveyor instead of directly into raises. If this proves feasible it will effect an increase in the difference of the development costs for the two methods, and will permit of mining by mechanical means ore bodies of greater thickness as well as some thinner ore bodies that cannot now be mined economically.



—U. S. Geological Survey.

There is much the Survey can do by mapping new areas

How The U.S.G.S. May Serve The Mining Industry

In Basic Research Directed Towards the Location of New Mineral Deposits, the Survey Can Make an Important Contribution to the Future of Mining

By R. N. HUNT

Chief Geologist
United States Smelting Refining and Mining Co.

IN speaking the other day with a young member of the United States Geological Survey I laid emphasis on certain jobs I thought the Survey might do greatly to the benefit of the metal mining industry of the West. I stressed two major functions of the Survey in which in the past it has distinguished itself: First, that of mapping. Mapping not so much in present productive areas, which under favorable operating conditions the mining companies can very well take care of themselves, as in the regions surrounding them. And in other unproductive areas set with much attractive geological scenery but otherwise uninspiring because of lack of promising values, at least in outcrops.

Second, I spoke of research on a scale rivalling that born of military necessity during the war and that of the great electrical and chemical industries before the war; first in geophysics, second, in certain fundamental geological problems on solution of

which prospecting in the near future may perforce depend if we are to adequately sustain metal production in this country.

The young man seemed a little surprised that I should look to the Survey to discharge so heavy a burden of work during the next decade. In fact, almost he seemed to feel some latent conflict of interest between the Survey and the mining industry. Surely nothing could be farther from the facts.

More than in the case of some other departments of the Federal Government has the Survey adhered to its traditional duties during the worrisome years before the war and the mad war years themselves. In sticking to its time-honored job of getting and disseminating information, the Survey has retained the confidence of the industry in its single-mindedness of purpose. And today I for one suggest that the Survey continue to adhere strictly to its recognized functions; but that it magnify them by

contriving a great increase in the scope and in the rate of progress in its mapping and in certain projects of research character. Mr. Wrather can speak for himself, but I believe the mining industry can confidently assume that those on the staff of the Survey responsible for its policies wish to do everything possible to facilitate the maximum development and the maximum ultimate recovery of our natural resources by the mining industry. Furthermore, if it can have the men and money, the Survey wishes to give its help in a timely way while yet the industry is strong and able to benefit by it.

Time is important. Some seek to prove by statistics, possibly for ulterior purposes, that we are about to exhaust our magnificent national heritage of metals. Fundamentally we should not yet despair of the future of metal mining in this country. But, as Reno Sales* has warned—and no one can speak with more knowledge than he—if we do not soon solve the critical operational problems presented by the continuing acute shortage of men in our mines and by maladjustments of metal prices to costs, and can not thereby enable operations to regain something of their former efficiency and to work off the very serious and growing deficit in exploration accumulated during the war and the preceding years of little profit, our situation may rapidly degenerate beyond hope

* Mining Congress Journal, October, 1946. Pages 30-34.

of revival, and we may then have cause to despair. The hour is surely past high noon and in a few years may be late indeed if our administrative and legislative leaders, state and national, do not soon comprehend that the mining industry can not long maintain anything like its present production without their sympathetic support, expressed in acts intelligently planned to protect and to stimulate the investment and reinvestment of capital in the fullest exploration of our major districts and in the search for ore in areas not hitherto productive. If such encouragement fail to come, new and returned capital will, as already may be the trend, look to the petroleum and other industries, or abroad for more attractive risks. We seem on dead center in these matters. Contrast our uncertain position in this country with developments at Broken Hill, Australia, opening what may be the greatest deposit of lead-zinc ore of all time.

Generous Financial Support Will Be Needed for the Survey

Not the least of several ways in which the Administration and Congress may contribute to the prolongation of the vigor of our metal mining industry will be by generous financial support of the U. S. Geological Survey such that it may retain able men and occupy them to the fullest in a greatly expanded program of mapping and research. By "generous financial support" I mean several millions appropriated in a manner avoiding annual uncertainty, assuring continuity in the Survey's program and protection to its personnel. I understand, Mr. Wrather's leadership has already achieved improvement in these matters by placing before Congress this year a five-year program stepping up the Survey's appropriations progressively from something like \$2,800,000 for the current year to \$5,000,000 in the fiscal year 1951-52.

The American Mining Congress has provided an opportunity for the industry to suggest how best these millions may be spent to help us whose job it is to maintain reserves in the mines we now have and to find new ones to replace, before it is too late, some of the great mines on which we depend so heavily for metal in peace and in war. Major districts comparable to those of Butte, Bingham and Bisbee we probably can not hope to find. But many orebodies may yet be found in present districts and new mines in areas not hitherto productive.

Increase in the supply and productivity of labor, lessening of the burden of taxes and of the uncertainties of price control, and other encouragement to the reinvestment of capital by existing companies, will make pos-

sible the exhaustive exploration of our major camps. They are most of them in strong hands eager and able to develop them to the utmost if and when conditions permit. In their further development there is little for the Survey to do directly. They have been remapped in far more detail, surface and underground, than the Survey would attempt. But in pushing our knowledge and mapping out into regions surrounding present districts and in mapping new areas potentially of interest, there is much for the Survey to do, and all preliminary to actual development, whether by drilling or digging. The drilling and the digging the industry is glad to do and can do far better than can any Federal agency. Furthermore, any Government agency undertaking the direct development of prospects belonging to Tom, Dick and Harry in the long run will leave more enemies than friends behind it, for it can not find ore in them all, and when it fails, well, some so and so just didn't know his business and drilled in all the wrong places. Intrusion of the Government into the prospector's

field can only discourage independent effort by individuals, small syndicates and companies. Rather the Government should create and foster conditions conducive to efforts by the many.

Potential Mineralized Areas Should Be Mapped

As you have no doubt heard or read, in two generations since the days of Clarence King and Major Powell, those almost legendary "Paul Bunyons" of the Survey—less than 10 per cent of this country has been mapped.

As rapidly as it can obtain men, the Survey, I understand, plans greatly to expedite its mapping program. It has been suggested that the Survey map regions round about and between active mining districts. Regions such as—to mention four in which are productive districts under active exploration: (1) The extensive limestone belt here in Colorado extending from Kokomo on the north, south and west through Climax, Leadville, Gilman, to Aspen and beyond. (2) The great volcanic pile of the San Juans of southwestern Colorado from Lake City and Ouray on the north to La Plata, Summitville and Creede on the south. (3) The Wasatch and Oquirrh ranges of Utah with the Salt Lake Valley between, a region enveloping Bingham, Park City and the lesser districts of Alta, American Fork, Stockton, Ophir and Mercur. (4) Much of Grant County, N. Mex.: Certainly that well-mineralized region in which Sam Lasky has already made a good beginning, extending from the old silver district of Georgetown southerly and westerly through Fierro, Santa Rita, Hanover, Pinos Altos, Tyrone, and the Burro Mountains. (5) A fifth might well be the foothills and lower west slope of the Sierras from Oroville to Madera—200 miles embracing the Mother Lode and a parallel belt of pyritic mineralization, which I suspect may be contained in a single story once it be deciphered.

Such regional projects will contribute structural and stratigraphic data useful in the further development of the districts within them.

When published, as soon after completion as possible, maps resulting from such projects will in themselves promote exploration such as may extend some productive area or disclose a potentially new one. Information put on a map gets into circulation. A spot of mineralization or of alteration adjacent to an intrusive mass, a strong fissure, or the outcrop of an horizon productive in a nearby area, may catch the eye of some energetic fellow whose enthusiasm may blow a flicker of interest into a flame of prospecting effort, long-shot though it may be. Such efforts are to be encouraged. The industry needs the help of individuals and independent



—U. S. Geological Survey.

The survey is well fitted to experiment with geophysical methods

groups who can venture a little capital. Such adventures have become all too few during the past quarter century. Their brave money must be encouraged in every legitimate way. In nothing so much as in prospecting does our economy gain by the very independence and diversity of opinion of individuals. One ventures where another will not. One proceeds where another has left off. Fifteen or twenty major mining companies can not do all the prospecting remaining to be done in the West, and least of all could any existing department of or any agency set up by the Government.

These regional projects will serve other important purposes: (1) They will provide the necessary basis in information for intelligently conducted geophysical surveys when and if we mining geologists catch up with the petroleum geologists in their use of geophysical data. (2) They will provide a more complete background and a larger frame within which to study ore deposits. This thought brings us to the second important function of the Survey which I wish to emphasize, to which the first, that of mapping, is preliminary.

This second function is that of "organized geological research."

During the past few decades the mining geologist has learned how to do a good engineering job of platting and projecting the geometry of the formations, veins, orebodies and structures within and along which the physical mine grows under the joint planning of the geologist and the operator and under the immediate direction of the latter. But once the maps are made, in questions involving the habits of veins and ore-shoots, the alterations enveloping them, or mineralogical sequences within veins or in replacement deposits zoned across a district, relations broadly apparent can too seldom be used in firmly forecasting results in the specific case. Again, and I do not think I exaggerate, any thoughtful geologist is acutely conscious of his often complete inability to indicate with any confidence the original metal content of a deeply weathered outcrop or what may be found at depth, even when perhaps some energetic prospector preceding him has not tried to guess but has dug down a little way to see. He can only speculate, even though shrewdly. He is forced to draw too largely on his own personal experience limited as to place and extent by the circumstances of his travels and livelihood.

I venture the opinion, which I hope can be shown to be wrong, that geology, our knowledge of fundamental geological processes, during the past quarter century has not advanced in the same degree as have other branches of science. The reason very

likely is that geology has not yet learned how to use the thought and the means of observation and analysis provided by modern physics and chemistry. Geology appears to have been far out-stripped by other fields of applied science—medicine, agriculture, and the great manufacturing industries. For this there is a very practical reason.

Geological Study Requires Time and Money

Our body of geologic fact and deduction is added to very slowly by the observations of individuals. Geological phenomena are out-of-doors, scattered over the entire face of the earth. Experimentation in the laboratory is rarely possible. Nature's experiments were completed long before the advent of the geologist and even in his post-mortem investigations the most energetic geologist shod with seven-league boots can not live long enough to observe with scientific thoroughness very many of them—least of all a teacher of geology with only his summers for field work, or a Survey man resident in Washington studying the migration of gold in Alaskan placers; or an employe of a mining company whose peregrinations extend no further than the business in hand may justify in time and expense.

I have a friend well known as a mathematician and physicist. Accustomed to the rigorous analytical methods of his science, once upon turning for certain information to our geological literature, he was astonished by conclusions drawn from the fewest possible cases, often a single case, or, to use his phrase, a "single experiment, and one not under controlled conditions."

Exigencies of distance and time have compelled the geologist to do the best he can with limited observation. In lieu of more extended observation by himself, when he writes he substitutes the published experience of other individuals. He has justification lacking in other sciences for drawing upon his imagination, for building inference upon inference. That his deductions sometimes stand for as long as a decade is a tribute to his genius.

Surely applied geology is a field which cries out for such organized research as we have seen the fruit of in a score of industries and during the war in the magic of radar, marvellous synthetics and in the crowning triumph of the atomic bomb and all it signifies for the future.

In the mineralogical sequence within veins and in the alterations which in some fashion precede and attend the formation of veins and orebodies, there must be clues useful to the prospector but beyond the power of his eye to discover. Despite much glib talk of colors and boxwork patterns,

the geologist must still stand humbly before a weathered outcrop.

Here are two practical research problems fundamental to exploration, on which little substantial progress has been made and I doubt can be made until directed groups of competent geologists, accompanied by chemists and probably physicists, can examine, not just one or two, but scores of districts and mineralized areas, utilizing modern laboratory means to learn more precisely and completely what the geologist's eye sees and in clumsy and very inadequate fashion tries to describe, and more particularly what is beyond the reach of his unaided eye.

These problems are probably no more difficult of solution than those on which millions have been successfully risked in other industries. Solution of them during the next decade could lead directly to discoveries which might greatly prolong the life of our major districts and supplement their declining production by tonnage from new areas, discoveries which could mean millions in returns repaying many-fold in taxes the million which it may be necessary to spend in properly organized and implemented research. Tools provided by such research will be a prerequisite to adequate metal production in the next succeeding decades.

Research Needed in Geophysical Methods

Paralleling research in strictly geological problems is the job of catching up with the oil industry in the application of geophysical methods to our exploration problems. In the '20s and early '30s the oil companies put millions into field work and laboratories in which they developed a variety of geophysical techniques providing firmer geologic control which now pays handsomely in reducing risk and making exploration dollars go farther in wells which penetrate deeper and deeper. One or more of seismic, magnetic or gravimetric surveys are routine steps preliminary to drilling. Schlumberger and temperature surveys of holes provide physical data checking the geologist's section and enabling production engineers to set casing correctly to the foot. Techniques so satisfactory in oil can not be directly applied to our mining problems. Much costly experiment and research will be necessary to evolve the means of applying a very considerable amount of dependable geophysical knowledge to our exploration problems both surface and underground. How successful we shall be we can not know until we try. But there is reason to hope the geophysicists may find tools for the mining geologist also. I am told the Survey has geophysicists on its staff who plan certain field studies in aero-magnet-

ics. The attempt to evolve geophysical and geochemical techniques applicable to mining problems is also research in which we hope the Survey's efforts will not be limited by timidity or funds.

At its inception all research is highly speculative. The solution of geological and geophysical problems is not more than those undertaken in many an industrial laboratory. It is to the credit of Mr. Sales and his company that in Butte he has what I understand is a very well equipped laboratory designed for certain geological research which he and his company consider practical and on all fours with that in metallurgy or other fields of investigation by engineers.

The organized geological and geophysical research which I have urged should not be left to the chance interest of mining companies. To benefit the industry as a whole it should be under auspices such as to make results available to all. It is long-range work of a scope and cost probably beyond the present means of a few mining companies. Individual companies will be occupied with their own local problems and there no doubt would come occasions for cooperation. Comparison can not fairly be made with the oil industry which has organized a certain amount of cooperative research. By its nature the oil industry is far more united. A specific problem interests a greater number. In mining we divide economically and geographically into gold miners on the one hand and into iron and coal miners on the other, with miners of the base metals sprinkled here and there between. We also divide geologically. The Lake Superior iron miner would have little interest in whether copper lay beneath a weathered outcrop in Arizona.

Because, in mining, there is a narrower base for cooperative support of costly research, does not mean that it may not be possible. But I think it unlikely on an extended scale, such as may succeed in telescoping several decades of the desultory efforts of individuals into a few years' comprehensive study. The time is all important.

The Survey Is Ideally Situated to Aid Exploration Research

In the absence of organized effort by mining companies themselves or in conjunction with members of their staffs, the Survey may well provide the leadership and press toward solution of problems fundamental to exploration work of the future. The expense will be great, but not more than would be justified nor more we hope than would be made available by Congress, if once it could be made clear that the Survey can organize and staff itself to undertake such

work and carry on adequately through a period of years. The Survey would no doubt draw on the personnel and facilities of our universities. With the support of the mining companies as expressed by individuals and more formally through such organizations as the Mining Congress, possibly very substantial sums could be added to the Survey's annual budget earmarked for such purposes. Our mines would be open to such investigations by men single-minded in their purposes and not bent on setting up local drilling programs either in fact or in the newspapers.

As I have said, the function of the Survey in research is not new. From its inception the Survey has been able to maintain high professional and scientific standards. The first objective treatise on the metamorphic processes affecting rocks and ores was Monograph 52 by Van Hise, Clark's *Data of Geochemistry*, Gilbert's classic study of Lake Bonneville, his and Spurr's structural studies of the Basin Ranges, and numerous other publications, are milestones in geologic thinking set up by the Survey on which any director can look back for inspiration. It is pertinent to mention that Chapter 10 of Becker's "Geology of the Comstock Lode," Monograph 3, summarizes in some 60

pages geophysical studies of natural potentials made on the Comstock in 1881.

Commendably the Survey plans greatly to expedite its mapping program, has already initiated certain work in geophysics and geochemistry, and it recognizes its function in the study of geological processes when it stations Dr. Lovering for two years in the Tintic District, Utah, there to study alterations in the vicinity of the Tintic Standard mine, and when it sends Dr. Schwartz to Arizona to study petrographically alterations over the new San Manuel copper orebody. Such, however, are highly individualized efforts of limited scope. No matter how able the men, they are likely to have little result of general usefulness. We wish to strengthen the Survey's confidence in our support of geological research of broader scope, adequately financed, staffed and directed, probably in part by men from the universities, in the hope that such work may provide the industry with geologic tools necessary in the near future if substantial production is to be maintained. Mr. Wrather a year ago in Denver, and again in the last number of *Mining and Metallurgy*, affirms his faith in such research. May he have our support, the funds and the men to organize it.



Industry is in a better position to do the drilling than a Federal Agency



Constant checking is a "MUST" for safe ventilation

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D. HARRINGTON

Chief, Health & Safety Branch

AND

R. G. WARNCKE

Mining Engineer, Bureau of Mines
U. S. Department of Interior

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Safety Equipment in Reducing Coal Mine Accidents—Part II

SAFETY devices and equipment not tested by any Government agency and brought into use in quantity in the United States coal mines within the past one or two decades include safety wearing apparel, such as hard hats and caps, safety shoes, goggles, knee pads, shin protectors, knee pads and gloves for certain types of work; wetting agents are being introduced to aid in dust suppression; the use of rock dust for prevention or suppression of coal-mine fires and explosions with attendant rock-dust distributors and barriers has been of relatively recent origin (about 25 years); the use of devices, such as Airdox and Cardox, for bringing down or "blasting" coal is also of relatively recent origin.

In connection with the prevention or handling of fires, there is much relatively recent equipment, such as fire-resistant electrical cables, sectionalizing trolley power lines, fire extinguishers to be used on mobile equipment as well as at stations, underground fire trucks (water and chemical), mine stoppings of incom-

Eternal Vigilance Is the Path to Safety. Only by the Constant Study and Testing of New Equipment Can Methods of Safe Mine Operation Be Developed

bustible materials, fireproof shaft linings, and slope and drift portals, the more extended use of circuit breakers and automatic electric switches, boreholes to take power lines into mines, the grounding of pipe lines and electrical equipment, the fireproofing of structures for more or less permanent underground electrical installations, such as pumps, transformer rooms, motor generator sets, etc.; the fireproofing of underground stables; and fire-resistant brattice cloth and mine timbers, as well as other fire-prevention or fire-handling procedures.

The relatively recent past has also brought forth much miscellaneous safety equipment, such as altimeters in connection with ventilation determinations, automatic warning devices in connection with stoppage of mine

fans, air locks for controlling ventilation, relief doors for mine fans, for fan protection in case of explosion, fireproof housing for surface fans, main fans far more efficient than those previously available, and numerous other adjuncts for increasing the efficiency of coal-mine ventilation.

Aids to increased safety in haulage of men and coal and other materials in coal mines available relatively recently, include the conveyors, scrapers, belts, shuttle cars, etc., that can supplant the usual track haulage, the introduction of covered and otherwise protected man-carrying cars and cages, the more extended use of block systems to control the movement of underground trips, the substitution of all-steel cars for the old-time combination steel-wood mine

cars, and the increase in the size of track rails, with gradual elimination of wooden rails, even in rooms. These and numerous other innovations of a similar nature are gradually helping to reduce the far too high haulage-accident rate of United States coal mines.

Methods of Handling Explosives Have Been Improved

Some more or less recent safety advances in connection with the handling and use of explosives in our coal mines are the numerous improvements in storing and handling explosives on the surface and underground brought about during the war period, including extended use of covered insulated cars for transporting explosives underground and of individual non-conducting, non-sparking bags or boxes for carrying and storing explosives and detonators, the construction and suitable barricading of explosives storage magazines on the surface, etc.

Scores of additional types of coal-mine safety devices and equipment could be noted, some relatively new, others employed for decades, among them automatic or self-acting dumps and self-filling and self-dumping cages and skips, wider use of trolley wire guards and other protective devices against the innumerable hazards of trolley haulage, the installation of parallel throw track switches, etc.

In the domain of electricity, scores (probably hundreds) of devices and gadgets, chiefly of relatively recent origin, have been introduced into coal mining with intent to safeguard the greatly expanded use of electrical equipment in the United States coal mines in the last 20 years, but chiefly the last decade.

Roof Support

Although a little progress has been made in trying to introduce safeguards against accident from falling roof or coal, this problem remains the most difficult to handle or control, and more than 50 per cent of the annual coal-mine fatalities are still ascribed to these causes. Probably the best procedure now available toward reducing such accidents is the adoption and strict maintenance of systematic timbering, with recognition of the fact that "good roof" is a misnomer and dependence upon it is almost certain to result in accidents, usually of a very serious nature. Use of steel "timbers," safety posts and safety jacks and making an adequate supply of the correct sizes and lengths of timbers, cap pieces, wedges, etc., readily available at or near working places, with attendant close supervision, appear to be about the only feasible procedures now available for handling this problem. Admittedly

these proposals are not at all definite, and ultimately drastic moves may become necessary for handling the problem. Insofar as now can be foreseen, adoption of really feasible methods for doing a good job in reducing accidents from falls of roof and coal might increase the cost of production to such an extent as very greatly to restrict the use of coal. The problem is somewhat analogous to that of fatalities from automobiles in our streets and highways. The number of fatalities from automobiles can

be considered too hazardous for use in a gassy mine. In consequence, need for this type of equipment led to the development of an enclosed permissible motor which eliminated many of the known hazards. The rapid growth of mechanization, requiring many and various types of electrical equipment, greatly stimulated the increase of safety equipment, for with the rapid advancement of mining, the equipment would be of little value if it could not be used with some degree of safety.



Ventilation control is an important safety factor

unquestionably be reduced from the present approximately 25,000 per year to fewer than 5,000 by the simple expedient of reducing speed to less than 10 miles per hour, which the people of the United States unquestionably would not countenance.

Study of Hazards Develops Safety

Many, if not most, items of safety equipment prove the adage that "Necessity is the mother of invention." The first mechanical equipment developed and introduced for underground work, proving its value as both labor-saving and increasing production, introduced many hitherto unknown hazards to workers and to mining in general, with the result that experience in their use and study of the new hazards practically called for changes in design and safeguarding both workers and property if use of the equipment were to be continued with success. The introduction of electrical equipment underground is a typical example. When first introduced in mines, electrical equipment caused many accidents and widespread mine disasters and was con-

sidered too hazardous for use in a gassy mine. The many fatalities caused by explosives and the numerous mine disasters resulting from their use prompted the search for explosives that would be less hazardous and thus led to the development and introduction of permissible explosives. While electrical apparatus and explosives are the outstanding examples of progress, they cover but a small part of the field of safety equipment for use in coal mines. The development of practically all other safety devices can be similarly traced to a necessity of overcoming or lessening a hazard known to exist.

Mine Haulage Locomotives

Practically all electrical equipment for underground use can be made relatively safe except the trolley-locomotive system. Although this system has proved to be rapid, economical, efficient, and productive, in spite of all these advantages so many inherently hazardous features and unsafe conditions are involved with its use that it cannot be operated under reasonably safe conditions. Three of the four major disasters during 1944, with a total of 88 deaths, were caused by

trolley wires. Many fires and explosions with large loss of life and property damage have been the penalty from utilizing this very hazardous method of transportation. These hazards have been given much thought by safety-minded operators and engineers, but little has been found that can or would eliminate the dangers.

Permissible storage-battery locomotives are being used successfully for gathering in very gassy mines and to a limited extent for secondary haulage in place of trolley or trolley-and-cable locomotives. In the past few years it has been suggested that the electric trolley locomotive be replaced by Diesel-powered locomotives for underground coal-mine haulage. Diesel mine locomotives have been in use for the past few years in the coal mines of the British Isles and for at least 10 years in the mines of Continental Europe and with proper safeguards have been found to be safe, economical, and efficient for coal-mine haulage. They have been used in rock tunnels and metal mines of the United States but due to state laws against the use of internal-combustion engines in coal mines they have not been considered for coal-mine use. In September, 1944, the Bureau of Mines issued a schedule for the testing and approval of Diesel mine locomotives for use in coal mines, and although no locomotives have been submitted for testing, several manufacturers have manifested interest in the schedule and it is believed that models will soon be submitted for testing and approval.

Causes of Explosions and Fires

The coal mines of the United States depend very largely upon safety devices, safety equipment and safety procedures in the heavy production of coal in this country and their annual expenditures in these efforts to bring about reasonable safety aggregate many millions of dollars annually, certainly not less than \$25,000,000. Notwithstanding this, far too many coal mines are not doing their share in installing safety equipment and safety procedures, and the relatively high accident rate still in effect in the coal mines of the United States is due largely to these "slackers" in safety. Less than half of the electrical equipment used in our coal mines is of the permissible type, and this is chiefly the reason that, of about 1,944 fatalities caused by coal-mine explosions and fires in the past 17 years, 1,089 or about 56 per cent are due to ignitions of gas or dust by electricity, chiefly non-permissible equipment such as trolley or cable reel locomotives, non-permissible mining machines, non-permissible electric motors, non-permissible electric drills, etc. And 402 of the 1,944 fatalities, or about 21

per cent, from coal-mine explosions and fires during the past 17 years, were caused by open lights or smoking, practically all of which could have been prevented if permissible electric cap lamps had been used with a no-smoking rule in effect and enforced. Add to this the fact that, in the same 17-year period, 335 fatalities out of the total of 1,944 (or about 17 per cent) from explosions and fires in United States coal mines were caused by explosives, chiefly non-permissible explosives, such as black blasting powder and dynamite. Hence, it appears that approximately 1,826 out of 1,944 fatalities (or about 94 per cent) due to coal-mine explosions and fires in the United States during the 17-year period 1929-45, inclusive, were due to ignitions caused by non-permissible coal-mining equipment. There is only one obvious comment about this: All coal mines should use only the safest equipment available. Even then, numerous hazards as to equipment and devices will remain.

Unquestionably the use of permissible electric cap lamps in the United States has prevented the occurrence of scores (possibly hundreds) of coal-mine explosions and fires in the approximately 30 years they have been available. Hundreds of fatalities have been avoided thereby and many millions of dollars of unnecessary charges of various kinds have been saved the coal-mining industry. The use of permissible explosives and of permissible electrical equipment, chiefly in the supposedly more hazardous types of mines, has achieved results similar to those above ascribed to the use of electric cap lamps; in fact, it is almost a certainty that if it had not been for the availability of permissible explosives, permissible electrical equipment and permissible electric cap lamps it would not have been possible to operate many of our larger produc-

ing mines because many of them have definitely hazardous gas and dust conditions.

Safety Equipment Must Be Used Intelligently

Safety devices and equipment have unquestionably been the salvation of the coal-mining industry of the United States, enabling many extra-hazardous properties to operate, but it is unfortunate that far too many coal mines use relatively unsafe (and slightly lower-cost) devices and equipment because they supposedly have such good natural conditions that the safety equipment can be dispensed with and equipment of inferior safety and lower cost used. Until this fallacious reasoning is overcome and all coal mines (large or small, gassy or non-gassy) use the safest available equipment and methods, the accident rate for coal mining will continue to be the highest of the major industries of the United States. Even with use of the safest available equipment and procedures, coal mining is always going to be difficult to conduct without many accidents; and it should always be remembered that the introduction of nearly any kind of mechanical equipment, even the safest kind available, into underground workings introduces its own hazards, though if it is of the right type, it should remove or prevent more hazards than it creates.

One of the worst of all fallacies in connection with safety equipment or devices (and this applies with especial force to coal mining) is that such equipment is foolproof. All safety equipment has its limitations, and unless these limitations are understood and precautionary measures kept in effect, accidents are likely to occur. Certainly safety equipment must be kept in the best of repair, or it quickly becomes unsafe.



Steel timbering and concrete piers can eliminate hazards of bad ground

Collective Bargaining In Health

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By **ANDREW FLETCHER**

Executive Vice President
St. Joseph Lead Company
and President
Industrial Hygiene Foundation

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THE St. Joseph Lead Company, with which I am associated, is the largest miner of lead in the United States and one of the major zinc metal and oxide producers. This company thoroughly realizes from its own experience, over a long period of years, that dollars invested in improved working and living conditions pay large dividends in dollars, as well as in human happiness.

As good health is the most important asset in life, the development of healthy conditions should be the one common meeting ground of agreement between management and labor. Health should not be a subject to be pulled apart, shoved around and bargained about. Of course, there may be differences of opinion in the procedure and techniques employed in approaching the goal of maintaining the health of workers, and in the method of increasing the ultimate profit of the employer by improved working and living conditions. Such matters are doubtlessly appropriate subjects for discussions between the interested parties, but I emphasize that techniques are but tools. If an employer fails to remedy a hazard or a menace which contributes to poor working conditions, this constitutes a legitimate grievance. It should not be necessary, however, nor is it desirable that fundamentals of health maintenance become matters of collective bargaining, any more than should the principles of management and engineering.

I have been especially concerned during the last few months with the propaganda in collective bargaining negotiations throughout the country for including in union contracts a given number of days of sick leave with pay. We all realize that over a period a man or his family will be sick, and that he cannot work year in and year out, 100 per cent of the operating time, but the wage rates have been and should continue to be based on a reasonable amount of sick absenteeism—if they are not high enough they should be increased. But just as soon as more than a reason-

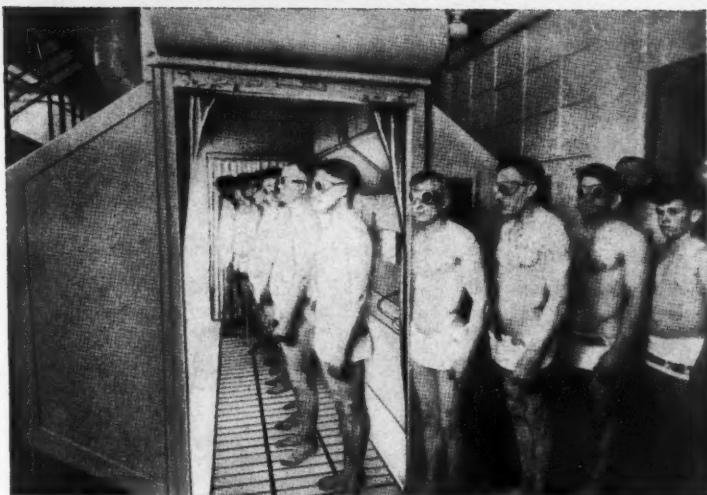
In Addressing the Annual Congress of the American Medical Association on Industrial Health, Mr. Fletcher Emphasized That Labor and Management Should Confine Negotiations to Wages, Hours and Working Conditions. He Made it Clear That Sickness and Hospital Benefits Can Be Carried More Cheaply and Effectively by the Workers or Their Unions Than by an Insurance Company

able amount of time off for sickness is allowed, then it is solely an indirect way of obtaining a higher rate of pay, and a way which will have the direct result of increasing absenteeism and therefore higher operating costs. The welfare and retirement fund in bituminous coal contract created by the employers paying 5 cents per ton is just an indirect way of paying a higher hourly wage rate. Last winter when the union committee in our Southeast Missouri operations asked for 15 days' sick leave with pay, I thought that it would be of interest to find out just how much time was lost through sickness. For the last six and a half years we have kept a fairly accurate record of our absenteeism, which covers absences of one or more days. I would like to emphasize that our records are based on the employees' statements to us, and it is therefore quite probable that during the hunting and fishing seasons, the absentee excuse of a cold may have been somewhat exaggerated. In any event, our sickness figures are therefore more apt to be high than low.

Our average time lost through sickness for the past six and a half years is slightly less than 1½ per cent; the time actually lost, on the basis of the employees' own statements to us, is therefore slightly less than five days per year on a six-day week, and less than four days on a five-day week. It therefore appeared to me that the union committee was "negotiating" when 15 days' sick leave was asked. I am confident that if sick leave with pay had been given, the time lost through sickness or alleged sickness would be greater than 1½ per cent of the shifts worked, and the cost of our mining operations would be even higher.

In further connection with these comparative figures, someone may be interested as to why the time lost from industrial injury has risen from .15 per cent in 1940 to .44 per cent and the so-called personal reasons from .87 per cent to 3.51 per cent in 1945 and back to 2.93 for the first six months in 1946. We felt that accidents would unfortunately probably increase when the five-day per week prewar basis was increased to six, when the younger men left for military service, and their places filled with older and more unskilled men, and when through unionization the control of management was lessened through grievance committees' procedure, etc., as commenced in 1943. The increase in personal reasons is probably because on a six-day basis a man was required to take time for family necessities, he became tired under wartime restrictions, and also the increase is because with his greatly increased weekly earnings, he had sufficient money for his needs without working the full six days. The decrease in 1946 is possibly because we returned to a five-day week in May, and the men have less take-home pay even though wage rates were increased to the Government pattern of 18.5 cents per hour.

Another matter that we all hear considerably discussed, and one which is becoming a factor in collective bargaining, is the taking out of health and hospital coverage. At the outset, let us realize that if the employer pays all or a portion of the cost, it is solely an indirect wage and salary increase. As stated previously, in my opinion we should bargain collectively on wages and salaries—but not confuse the issue by bargaining on health



The use of a solarium can reduce fatigue and sickness

matters. However, when the question came up at one of our divisions, I said that I would find out what the estimated cost would be if the coverage was taken out with an insurance company instead of the risk being carried by our men themselves, as they have been doing at some of our units for over 25 years. The comparison showed that the insurance company would:

	Per Year
Pay in claims, 14.42×65.46 per cent	\$ 9.44
Return for overhead, 14.42×15.52 per cent	2.24
Total cost	\$11.68

Based on our detailed figures, the average amount paid out in claims was 81.4 per cent of the contribu-

tions. The annual cost for sickness coverage per employee was approximately $\$6 \times 81.4$ per cent, or \$4.88 per year—in comparison with around \$11.68 if the coverage was carried by the insurance company.

I feel that the reason why the insurance company's payment for claims is approximately 100 per cent higher than our men's cost (\$9.44 in comparison with \$4.88) is because, being an insurance company, which could increase the net premiums by paying smaller dividends in the event of a poor experience record, they would be more liberal in considering a sickness claim than our men would be—also our men would be more "liberal" in making claims against an insurance company than against their fellow workmen. In my conversations with the insurance company representa-

tives, they make the rather unique statement that the cost was not \$11.68, but only \$2.24, which was their overhead, as our employees would receive the \$9.44, which was better than the \$4.88 when they carried all the risk themselves. For obvious reasons, this argument did not appeal to me.

I feel that sickness and hospital coverage can be carried cheaper by the men themselves or by their union than by an insurance company. If, however, they do not wish to assume the risk and desire a policy, they should arrange for it themselves and they should pay the entire cost—if the employer pays any portion, then men, being only human, will take advantage of the policy by "liberalizing" their claims.

In conclusion—the sooner labor and management confine negotiations to developing a suitable wage and salary rate structure, stop negotiating on matters that involve payment for time not worked, such as sick leave with pay, payment for liberalized sickness and hospital claims, the sooner our Government stops paying subsidies that encourage inefficiency, as is now being done in the mining industry, and stops paying bonuses for not growing products, etc.—the better off America and the world will be. The only way that all of us can benefit is through increased production and the resultant higher standard of living through having more goods at lower cost. Unfortunately, many people and organizations in the United States are today thinking and conducting their operations on the selfish basis of "He is getting his, so I had better get mine." We should, one and all, think at times—is it for the best interests of our community and our country?—and when it is, then act constructively!

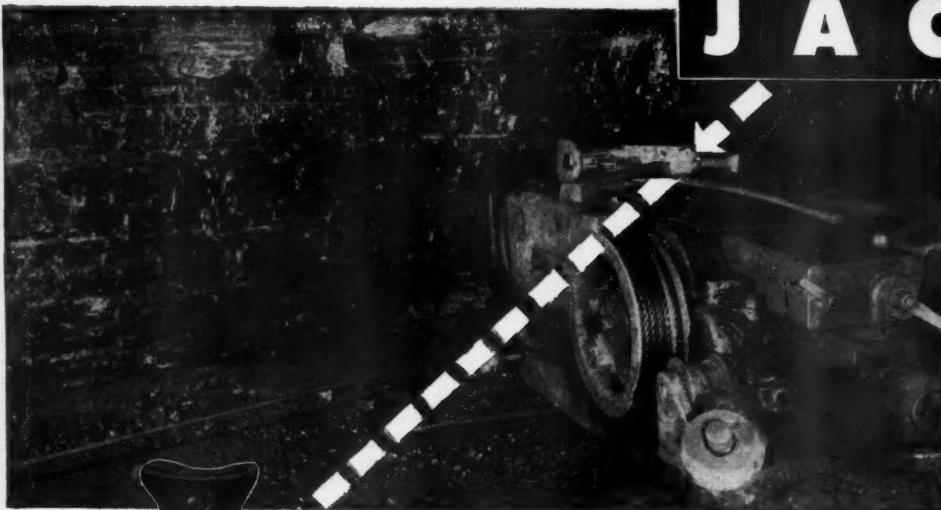
May We Have Your Comments?

Believing that the best way to improve the contents of our publication is through consultation with our readers, the Editors invite your criticism, both favorable and adverse. What type of article is most useful to you on your job? Which articles during the past year have been of greatest interest to you and your organization? Suggestions are welcome at all times and your assistance can help us make 1947 a banner year for Mining Congress Journal.

The Editors.

THIN SEAMS CALL FOR SIMPLEX

NO. 84A JACKS



No. 84A, (5-tons)
for thin seams.
Height 14", lift 7".

This low height Simplex General Purpose Mine Jack is made for working thin seam coal. It speeds the moving and adjustment of coal cutting machines, conveyors and loaders; re-railing mine cars and light locomotives; track work, etc. *The Simplex No. 84A is easy to handle and use in cramped quarters—being but 14 inches in height and weighing only 28 lbs.*

For working medium seams, No. 85A and 1017, and for thick seams, No. 86A, are the accepted Jacks wherever coal is mined underground.

The Simplex No. 185 is a versatile Mine Jack, supplied with an adjustable drop forged auxiliary cap shoe which provides four adjustments. Loads can be readily lifted at a right angle to the operator on the auxiliary shoe.

These 5 and 10 ton Simplex Jacks are *speedy, rugged* and—above all—*safe*. Maximum safety is assured by such features as double lever sockets, stronger cadmium plated springs and links, shorter fulcrum centers, longer and wider concave rack bar toe lifts, larger trunnion bearings, stronger pawls and reinforced inner-ribbed housings.

Every one of your mining machines should carry a Simplex Jack—many are furnished as standard equipment—be sure you properly equip the balance. Send for new bulletin—Mines-46.

No. 85A, (5-tons) for medium seams. Height 17", lift 10".



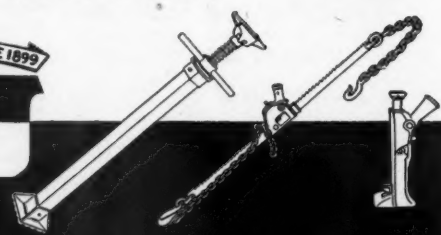
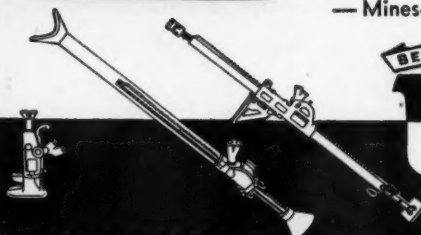
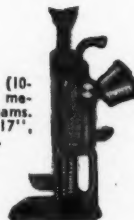
No. 86A, (5-tons) for thick seams. Height 20", lift 13".



No. 185, (5-tons). Height 17", lift 10". Lifts at right angle to operator on auxiliary shoe.



No. 1017, (10-tons) for medium seams. Height 17", lift 7 1/2".



TEMPLETON, KENLY & CO., CHICAGO 44, ILLINOIS

WHEELS OF GOV

As Viewed by A. W. DICKINSON of the American Mining Congress

BOTH the Senate and House swung over to Republican control in the heavy protest vote registered in the election of November 5. The Senate is now made up of 51 Republicans and 45 Democrats and the House membership of 247 Republicans and 186 Democrats. The general program of the majority for the 80th Congress calls for lower taxes, decreased expenditures, ending of War and National Emergency powers, overhauling the labor laws, and a series of investigations of national affairs in the past decade.

Although the determination of the Senate and House leadership and the chairmanships of important committees still await action by caucus, it appears that Senator Wallace H. White, Jr., of Maine will be majority leader in the Senate and that the speaker of the House will be Rep. Joseph W. Martin, Jr., of Massachusetts. The important Ways and Means Committee chairmanship goes to Rep. Harold Knutson, of Minnesota. Chairmanship of the Senate Committee on Finance is undetermined but will probably go either to Ohio's Robert A. Taft or Colorado's Eugene D. Millikin. Chairmanship of the Senate Committee on Labor and Welfare, a hot spot, lies between Ohio's Taft, Vermont's George D. Aiken and Minnesota's labor legislation-minded Joseph H. Ball.

Senator Taft, who is chairman of the Senate steering committee, has indicated a tax revenue objective of \$32 billion for the fiscal year beginning July 1, 1947, to be accompanied by a budget of between \$25 billion and \$30 billion. He has declared for balancing of the budget but states that tax reductions must be gradual and drawn out over a long period. The plan is to reduce taxes by around \$8 billion by lowering rates on the individual income tax and paring down excises.

The new Congress plans to carry

out the provisions of the Congressional Reorganization Act which drastically reduces the number and size of committees both in the House and Senate. An exception to this policy is likely in the case of the proposed Committee on Armed Services—in place of which the present separate Committees on Military Affairs and Naval Affairs will probably be continued.

Coal Strike

Subsequent to the impasse reached in the Krug-Lewis discussions on a bituminous coal contract the miners have remained away from the mines since midnight, November 20. A court order seeking to restrain Lewis from declaring the contract terminated has been followed by contempt of court proceedings. Found guilty of contempt, Lewis is under sentence of a fine of \$10,000 and the United Mine Workers of America's fine is set at \$3,500,000. Recent overtures made by the mineworkers' leader to various operators at captive properties, in the hope of breaking down resistance to his demands through a division in the ranks, have met with cold response.

Lewis' demands upon Interior Secretary Krug have been reported by the press to include (1) a reduction in hours from the present 54 to 40 (including travel time), with an increase in the hourly rates so that pay for the 40 hours would be the same as for 54—this would raise the basic hourly rate from \$1.18 to approximately \$1.77; (2) doubling the present welfare charge of 5c a ton on all coal mined; (3) retaining the Federal safety code.

Supervisory Employees

The question of unionizing mine foremen, which first came into dispute between coal mine operators and the UMWA, continues to move through a series of court actions. In early November Jones and Laughlin

Washington Highlights

CONGRESS: Republicans control 80th Congress.

TAXES: Early cuts on individual income tax.

COAL: No production since November 20.

SUPERVISORY EMPLOYEES: Unionization issue in courts.

"INCH" PIPELINES: May carry gas?

LABOR LEGISLATION: Congressional leaders prepare to act.

FREEDOM OF SPEECH: Court reverses NLRB.

TRAVEL-PAY: Rash of demands and suits.

TRADE AGREEMENTS: State Department publishes commodities list.

WAGE-PRICE: Controls removed.

PREMIUM PRICE PLAN: Payments continue to June 30, 1947.

Steel Company attorneys presented oral arguments before the National Labor Relations Board against the Board's decision certifying the United Clerical, Technical and Supervisory Employees' Union as a collective bargaining agent for supervisors at the company's mines. The J. & L. Company introduced evidence showing that lost-time accidents have more than doubled since the supervisors became members of the union. It is also stated that the supervisors are not reporting violations of the working and safety rules of the mines, as they have normally done in the past. Evidence was submitted to show that the efficiency of the supervisors is reduced and the operator's control of the property is lessened when supervisory employees became affiliated with the rank and file union.

Former Board member Gerard D. Reilly has stated that existing legal decisions permitting unionization of the foremen are "a plain invitation to all labor organizations to annex the foremen in mass production industries when they have always been regarded as the direct representatives of the employer." Reilly then declared that

"if the function of the supervisor is generally to be subjected to the discipline of the labor movement, it will ultimately mean that for all practical purposes labor unions will become independent contractors."

Meanwhile the Supreme Court is preparing to rule on the Packard Motor Company supervisory employees case, in which a Federal circuit court ruling required the company to recognize and bargain with the Foremen's Association of America. The Packard Company states in its Supreme Court petition that, "The Circuit Court failed to apply the universal rule of law that an agent will not be allowed to enter into relationships which may conflict with the interests of his principal (employer), and by its judgment placed the agents of the petitioner (Packard) in a position where they will be dominated, pressured and controlled by the union that represents them." The petitioner further contended that its 1100 foremen function directly in the interest of the Packard Company in carrying out the very purpose of the National Labor Relations Act, which after all is primarily collective bargaining.

"Inch" Pipe Lines

Right in the midst of the hot controversy over fuel supply brought about by the coal strike, Chairman Slaughter (Dem., Mo.) opened hearings before the House Surplus Property Committee on the numerous proposals for disposal of the "Inch" pipelines. These lines, running from Texas to the eastern seaboard, were built by the Government for the transport of petroleum and petroleum products as a war emergency; the original investment has been stated as \$146 million. The War Assets Administrator testified that his agency had rejected all 16 bids for the pipe lines on the ground that none of them guaranteed a fair price to the Government. In the present emergency there is heavy pressure to turn the pipe lines over to the transport of natural gas and it is even possible that the Slaughter Committee will so recommend. Such a policy will, however, meet heavy opposition in the Congress, and will be pointedly opposed by the coal and railroad industries. Rep. Walter (Dem., Pa.) has testified that the right-of-way through the State of Pennsylvania was granted only for the transport of petroleum and its products and that the use of the lines for gas will not be permitted in his State.

Labor Legislation

Expressions from key men in the new majority in both Senate and House give assurance that a determined effort will be made to overhaul and reinforce Federal labor laws to

curb the monopolistic powers now exercised by unions. Both Senators Ball of Minnesota and Taft of Ohio have been quite definite in their statements that action must be taken along these lines by the 80th Congress and Rep. Halleck of Indiana, who is looked upon as the probable new majority leader of the House, is known to hold similar views.

Senator Ball, who carried the brunt of the battle for the Case Bill which met a White House veto last spring, has been outspoken in calling for action. He has stated in public addresses that the provisions of the Case Bill "were thoroughly studied and I think we can reintroduce them and go ahead with hearings immediately." The Senator declared that the proper legislative approach should be to define new rights, responsibilities and duties in the law and leave it to the courts to apply that law to specific disputes and situations. Ball asserts that there are four general fields to be covered by legislation.

First he called for the Case Bill provision establishing an independent five-member Federal Mediation Board.

Second, he urges that the Wagner Act be overhauled to equalize responsibilities of unions and employers; that findings of facts made by NLRB be made subject to review by the courts; that the right of free speech between employers and employees be restored; that unions as well as employers be required to bargain collectively; that an employer may petition at any time for an election among his employees to determine their bargaining representatives, and that any strike prior to announcement of the result of the election be branded as an unfair labor practice; that supervisory employees be recognized as representatives of management; that unions be made sueable as legal entities for violation of contract; and that a secondary boycott in restraint of trade be made a violation of the Sherman Anti-Trust law.

Third, in protecting individual workers and minorities against arbitrary exercise of power by union leaders, the Senator would outlaw the closed shop; he would repeal the proviso in the Wagner Act which legalizes contracts making membership in the union a condition of employment and prohibit such contracts.

Fourth, Ball called for legislative solution of the problems created by industry-wide collective bargaining with the ever-present possibility of industry-wide shutdowns. He has in mind the application of the anti-trust laws to industry-wide strikes or lockouts, or possibly the prohibition of collective bargaining on more than an individual employer basis.

The Minnesota Senator publicly proclaimed that he will value the help

that the leaders of organized labor can give in working out the legislative solution of these problems, but that if these leaders continue to oppose any and all changes in the present law, Congress will have to go ahead and do the best it can without their help and advice.

Freedom of Speech

Bearing directly on the restrictions imposed by the Wagner Act is a recent Federal Circuit Court of Appeals decision in St. Louis, in which the Court held, in overruling NLRB, that the Company (Montgomery Ward & Co.) had the right to reply to remarks made by the union, under the First Amendment to the Constitution, which guarantees freedom of speech.

The Court reversed the NLRB on the following principles: (1) that compulsory attendance of employees, at a meeting called by the company labor relations director for the purpose of replying to union remarks, did not constitute coercion; (2) that opposition expressed by the company to the closed shop was legal and proper; (3) that the timing and circumstance of the company-sponsored meeting were proper; (4) that the discharge of three workmen who refused to process orders which they felt would have been handled by another company plant (strikebound) was justifiable; (5) that the NLRB's finding, that the company discouraged union membership illegally by telling employees about a libel suit brought by the company against the union, was improper.

A part of the Court's definite and far-reaching statement declared, "The right of free speech guaranteed by the First Amendment is not limited to any class and should not be denied an employer by the terms of the National Labor Relations Act. It is only the abuse of that right in attempting to coerce employees that is forbidden by the Act."

Travel Time Pay

Following the New Mexico potash travel time pay suits reported last month, a rash of similar demands and suits has broken out all over the country, based largely on the Supreme Court decision in the Mt. Clemens Pottery Company case. The CIO United Steel Workers has announced through counsel that "walking time" pay suits will be filed against many of the steel companies. This may involve above 800,000 workmen asking for retroactive pay on an overtime basis, with an equal amount as "liquidated damages," plus attorney fees.

A travel time pay claim has been settled by the Dow Chemical Company retroactive to September 9, 1940. Payments involved are reported to be

(Continued on page 61)

Personals

At a meeting of department heads of the St. Joseph Lead Company at Bonne Terre, Mo., on November 11, Clinton H. Crane, president, announced that after the next stockholders' meeting he will become chairman of the board of trustees and that Andrew Fletcher, executive vice president, will succeed him as president.



Clinton H. Crane

Mr. Crane has headed the St. Joseph Lead Company for 33 years. At the time he became president, the company was one of six engaged in operating mines in the Lead Belt of Southwest Missouri. Today the company has extensive holdings throughout the United States and is operating properties in Argentina. In 1929 Mr. Crane was awarded the honorary degree of Doctor of Science by the

Colorado School of Mines. He received the William Lawrence Saunders Medal from the AIME in 1936. From 1930 to 1945, inclusive, Mr. Crane was on the board of directors of the American Mining Congress.

He has always been an ardent yachtsman and as a young man was associated with the shipbuilding industry.

Andrew Fletcher has been on the board of the Company since 1921 and on the executive committee since 1923. He became vice president in 1929 and in May of this year was appointed executive vice president. Like Mr. Crane, Fletcher has also been associated with shipping and during World War I was assistant superintendent of the Hoboken port of embarkation. He has been active in the affairs of the American Mining Congress and is a director and chairman of the finance committee.



Andrew Fletcher

Consolidation Coal Company (Ky.) announces the addition to their official staff of Lee D. Siniff in the capacity of mechanical and electrical engineer with headquarters at Jenkins, Ky. Mr. Siniff comes to Consolidation after 13 years with Rochester & Pittsburgh Coal Company of Indiana, Pa.

The advancement of James Reilly, general superintendent, to the position of general manager of underground mines for Hanna Coal Co. was announced in November. He replaces C. R. Nailler, who assumed position of vice president of Consolidation Coal Co. of West Virginia on November 15.

C. W. Plumb, who has been the general manager for the Idarado Mining Co. at Ouray, Colo., for the past two years, has been transferred by the Newmont Co. to Goldfield, Nevada. Mr. Plumb is to have charge of proposed field work at Goldfield. His place is being taken at Ouray by Fred Wise, who will continue with the development work at the Treasury Tunnel.

At a meeting of the board of directors of the Mineral Producers Association held in Pittsburgh October 26, the following officers were elected for the ensuing year: R. R. Bowie, Bowie Coal Co., Grove City, Pa., chairman of the board; R. S. Walker, Bradford Coal Co., Bigler, Pa., vice chairman; F. B. Wood, Sr., F. B. Wood Coal Mining Co., Barnesboro, Pa., treasurer; R. T. Laing, executive secretary, Mineral Producers Association, secretary; Matthew A. Crawford, Kittanning, Pa., general counsel.

L. K. Davis has resigned his position as employment agent with the New Cornelia branch of the Phelps Dodge Corp. in order to engage in mining. He will operate a copper-silver mine of his own in Graham county, located about 10 miles south of Coolidge Dam, which will be his headquarters.

Clyde A. Pippen was recently appointed secretary-treasurer of the Alabama Mining Institute. He will fill the vacancy caused by the death of H. E. Mills. Mr. Pippen is a graduate of the University of Virginia and was recently released from active duty with the U. S. Navy.

Max J. Caylor has been named district representative for Kennametal's Pennsylvania area which includes Ohio. His offices will be at Latrobe, Pa.

John R. Aho, mining engineer for the Oliver Iron Mining Co., at Ely, Minn., was recently appointed mine captain of the Pioneer Iron Mine on the Vermilion Range. James D. Warner has been appointed mine captain of the Sibley Iron Mine, also at Ely.

Clyde E. Williams, director of the Battelle Memorial Institute at Columbus, Ohio, was elected president of the American Institute of Mining and Metallurgical Engineers at a meeting of the board of directors on November 20. A graduate of the University of Utah, with an unusually extensive background in the field of chemical metallurgy, Mr. Williams became associated with Battelle at the time of its founding in 1929. In 1934 he was appointed the director of the organization, which position he still holds.

Thomas H. Miller, assistant chief of the Economics and Statistics Branch of the United States Bureau of Mines since January, 1945, has been appointed Assistant Director, Dr. R. R. Sayers, Bureau Director, announced November 26.

Mr. Miller, who has been associated with the Bureau of Mines for nearly 20 years, fills

one of the Bureau's two assistant directorships, replacing George A. Lamb, assistant director since May, 1944. Mr. Lamb resigned from the Bureau in October after an extended career in Government service and entered private industry in Pittsburgh, Pa.



Thomas H. Miller

After serving two years as supervising engineer of the Salt Lake City, Utah, section of the Economics and Statistics Branch, Mr. Miller was called to Washington, D. C., in May, 1940, when the national preparedness program resulted in a considerable expansion of the Bureau's statistical reporting facilities. Much of the Bureau's wartime statistical information on strategic metals was prepared under Mr. Miller's direction.

Ruth R. La Salle has left the staff of the *Mining World* to become associated in an editorial capacity with the *Arizona Times* at Phoenix. For many years Miss La Salle was news editor of the *Mining Journal* which was formerly published by Charles F. Willis.

Rudolph T. Elstad has been elected president of the Oliver Iron Mining Co., succeeding LeRoy Salsich, who is retiring after 45 years of operating and executive experience with the Oliver company. Elstad began his



Rudolph T. Elstad

service with the Oliver company during his summer vacations in 1917 and 1918 as a draftsman and rodman at Coleraine, Minn. Obtaining his technical training at the University of Minnesota, he was graduated with the degree of Bachelor of Science in Civil Engineering in 1919. Afterwards he became successively mining engineer at Coleraine, assistant general mining captain and assistant superintendent in Chisholm, Minn. In 1938 he was made assistant to the vice president and general manager at the Duluth general offices; he became assistant general manager in March, 1942, general manager in October, 1943, and was elected vice president on January 1, 1946.

LeRoy Salsich was graduated from the University of Wisconsin with the degree of civil engineer in 1901 and joined the Oliver company as a mining engineer in that year. A year later he became chief engineer for the Hibbing properties. In 1928 he was promoted to the position of vice president and general manager at the general offices in Duluth. He became president on March 1, 1930.

John R. Shoffner, professional engineer, Kittanning, Pa., resigned as chief engineer of the Allegheny River Mining Co. on August 1, 1946, and as chief engineer of the Freebrook Corp. and its affiliated companies on September 24, 1946. His offices, which were formerly located in the Keystone Building, have been moved to the Empire Building, where he will continue his consulting engineering firm, which is extensively engaged in appraisals, evaluation, research, development and operation of mining properties.

Prof A. Irving Levorsen, formerly of the Department of Geology, has just been appointed dean of the new School of Mineral Sciences at Stan-

ford University. Dr. Donald B. Tresidder, the president of the university, has announced the combining of the Geology and Mining Departments for the formation of this new school.

H. R. Hicks has been appointed general superintendent of Sandlick Coal Co. at Whitesburg, Ky. Mr. Hicks was formerly mine foreman for the Elkhorn Junior Coal Co.

R. W. Herlund, mining engineer and metallurgist, who had charge of reopening and reconditioning the 1,700-ft. Equity tunnel of the Nevada Equity Mining Co., has left Austin temporarily and moved with his family to Denver.

James M. Croak has been appointed general agent for coal for Illinois Central Railroad with offices in St. Louis, Mo.



LeRoy Salsich

Albert P. Boose, mining engineer, passed away at Cle Elum, Wash., on October 30 at the untimely age of 44 years. Mr. Boose's working life had been spent in the employ of the Northwestern Improvement Company at their coal mines in Washington and Montana, he having joined their engineering crew at Roslyn, Wash., in 1918, when only 16 years old. In 1925 he was promoted to resident engineer for their mines at Red Lodge, Mont., and on abandonment of these Red Lodge properties in 1932 he was transferred back to Roslyn. A sudden attack of pneumonia cut short a very promising career.

Dr. G. F. Loughlin of the U. S. Geological Survey died in Washington, D. C., on October 22. Dr. Loughlin was one of the outstanding geologists in the United States and his work on the ore deposits of Leadville and Tintic received international recognition. Dr. Loughlin was a graduate of Massachusetts Institute of Technology and received his Ph.D. in 1906 at Yale University. He joined the U. S. Geological Survey in 1912 and his career has been associated with many brilliant studies in mineral resources since that date. From 1935 to 1944 he was chief geologist and since 1944 he had been assigned on special work of a wartime nature.

Harry M. Hall, vice president of Consolidation Coal Co., died of a heart attack at the age of 63 while on a hunting trip in South Dakota, late in October. Mr. Hall started his business career in railroading in 1900 and in 1917 he organized the Fort Dearborn Coal Co. of which he became vice president. In 1933 Mr. Hall became

Fred O. Jones, formerly chief geologist of the U. S. Bureau of Reclamations Columbia Basin Project, recently signed a two-year contract with the Chinese Government to supervise geological investigation at its projected mammoth gorge dam on the Yangtze River. He will direct Chinese geologists and engineers in testing limestone bedrock for the best location of the dam site.

E. L. Sweeney, widely-known mill builder, has been retained by W. J. Loring, manager for the Tonopah Belmont Consolidated Mines Co., to install and place in commission the company's projected 250-ton cyanide flotation mill on the Belmont property at Tonopah. Sweeney recently returned from Australia where he built a gold mill capable of handling 2,800 tons of ore per day.

— Obituaries —

vice president of the Central United Coal Co., a subsidiary of the M. A. Hanna Co. When the Pittsburgh Consolidation Coal Co. recently took over the rail and coal departments of the M. A. Hanna Co., Mr. Hall was made a vice president in charge of the Chicago office.

J. Truman Evans, manager of the locomotive sales department of the Vulcan Iron Works, died late in October. Mr. Evans had been connected with this company for more than 50 years and was widely known for his genial personality and activities in community affairs at Wilkes-Barre, Pa., where he lived.

Eric Arthur Meale, for the past 28 years chief assayer at the East Helena plant of the American Smelting and Refining Co., died in Helena on October 17 at the age of 50.

C. L. Harrison, 73, long identified with Seattle and Alaskan mining circles, died at his Seattle home this November. Although in recent years he headed a large Seattle engraving company, he was founder and first president of the Alaska-Pacific Consolidated Mining Co., operating at Wasilla near Anchorage, Alaska, which was one of the largest gold producers in that section. He was born in Sparta, Mich.

W. Buford Davis was killed in an airplane crash on November 13 when an airline plane struck a mountainside near Burbank, Calif. Mr. Davis was well known in mining engineering circles in Colorado, Idaho and southern California.

NEWS *and* VIEWS



Eastern



States

Anthracite Producers Planning Employe Program

PENNA. A series of informative dinner meetings, aimed at acquainting employes of anthracite producing companies with industry problems and methods being used to solve them, has been projected by the Anthracite Institute for 5,000 key mining employes, Frank W. Earnest, Jr., institute president, announced recently.

Colliery superintendents, mine foremen, section foremen, outside foremen, fire bosses, department heads and the president, secretary and members of the mine committee of each local of the United Mine Workers of America will be invited to the meetings, which are to be held at the Anthracite Institute Building in Wilkes-Barre. Groups will be limited in size to permit full opportunity for discussion. At each meeting, in addition to the discussion, guests will visit the institute laboratory to inspect work being done by institute engineers in connection with development of new equipment designed to give anthracite users greater satisfaction. Engineers working on the various projects will describe details of each piece of equipment.

The first meetings were scheduled for November 13 and 14 for the supervisory staff of the Lehigh Navigation Coal Company. Supervisory staffs of

the Jeddo-Highland Coal Company and the Pennsylvania Coal Company will be the institute's guests the following week. The staff of the Philadelphia and Reading Coal and Iron Company have been scheduled to attend on the evenings of November 25, 26 and December 2, 4, 5. The Susquehanna Collieries group is to meet December 11.

It was estimated that it would take the greater part of the winter to complete the full schedule of meetings planned.

New Films Available

Secretary of the Interior J. A. Krug announced on November 17 that more than \$400,000 worth of educational motion pictures have been made available through the cooperation and generosity of the American mineral industries. A total of 15 new sound pictures dealing with mining, minerals and petroleum have been authorized for 1946, the Secretary said, with

three films already completed and 12 others in various stages of production. The new bureau pictures will be distributed free, along with others produced in past years, to schools, colleges, vocational training classes, the armed forces, scientific societies, business and civic organizations. The main distribution center for these films is at the bureau's central experiment station in Pittsburgh and although no charge is made for the use of the film, borrowers are required to pay transportation costs.

America's Oldest Copper Mine Resumes Production

V.T. The Elizabeth Mine, which was discovered in 1793, has recently resumed production. The Vermont Copper Company, Inc., began installing modern equipment at the Elizabeth Mine in the spring of 1942. A complete new surface plant has been constructed on the property including offices, warehouses, machine shop, compressor building and change house. A new crushing plant and mill with a capacity of 500 tons a day has also been operating and the Elizabeth has exceeded in copper production all previous records from Vermont.

This mine was first worked from

MARSHALL HANEY, Ph.D.
Consulting Mining Engineer
Examinations Reports
Appraisals
1103 Flower Avenue
Takoma Park, Md.

L. E. YOUNG
Consulting Engineer
Mine Mechanization
Mine Management
Oliver Building Pittsburgh, Pa.

the surface along the outcrop where open pit operations were extended over a length of 1,000 ft. to a depth of 60 ft. from the surface. Early operations were confined largely to the making of copperas (iron sulphide) as the ore was largely pyrrhotite. Copperas was used commercially in the early days for tanning. Heap roasting was the process used at this time but as more copper was encountered in the ore, smelting in reverberatory furnaces was used to make blister copper.

The ore is continuous over a length of 1,200 ft. with a width varying from 15 to 20 ft. It has been followed to a vertical depth of 600 ft. and recent drilling has indicated other new parallel ore shoots. This new development may indicate that the original Elizabeth orebody is only one of several.

Although mining in the Vermont copper district came to an end in 1890 as result of the Michigan and later the Arizona discoveries, the workings are still in excellent condition. The old stopes have remained open and although there has been no timber support, no caving has taken place since they were opened over 50 years ago. The district is remarkably dry and the negligible water flow has undoubtedly been a factor in preventing caving.

Recent diamond drilling and geological study have indicated important ore extensions in depth and along the strike.

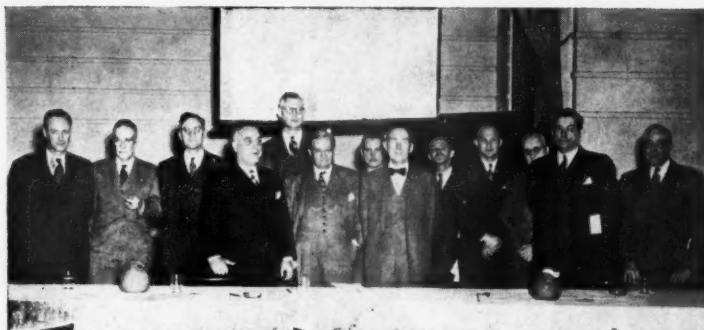
West Virginia Coal Mining Institute Meets



On November 15 the West Virginia Coal Mining Institute held its 39th annual meeting at the West Virginia Hotel in Bluefield. After registration the technical session opened under the chairmanship of R. H. Morris, vice president, Gauley Mountain Coal Co., T. A. Day, of Bituminous Coal Research, Inc., spoke on "Research for Tomorrow's Coal Industry." Mr. Day reviewed much of the work being done at Battelle Memorial Institute in Columbus by BCR and gave an account of the latest experiments underway on automatic stokers. J. D. A. Morrow, president of the Joy Manufacturing Co., followed with a very illuminating discussion of European coal problems and production.

At the luncheon meeting Joseph Pursglove, Jr., president of the Pursglove Coal Mining Co., was the guest of honor and spoke on the subject of his recent tour through the Union of South Africa. He also discussed South African mining methods and presented a most comprehensive account of the unusual conditions existing in the thick seam areas around Witbank.

THE LUNCHEON SPEAKERS TABLE AT BLUEFIELD



Left to right: Ivan A. Given, *Coal Age*; Julian W. Feiss, *Mining Congress Journal*; Dr. Irvin Stewart, Pres., West Virginia University; J. J. Foster, Island Creek Coal Co.; Joseph Pursglove, Jr., Pursglove Coal Mining Co.; J. D. Battle, National Coal Association; Clinton W. Thompson, Pardee and Curtin Lumber Co.; J. D. A. Morrow, Joy Manufacturing Co.; G. R. Spindler, West Virginia Department of Mines; W. A. Haslam, Island Creek Coal Co.; T. A. Day, Bituminous Coal Research; R. H. Morris, Gauley Mountain Coal Co.; Jesse Redyard, Redyard Coal Co.

The afternoon session was devoted to two papers, one by J. D. Battle, secretary, National Coal Association, and the second by C. W. Thompson, mine superintendent, Pardee and Curtin Lumber Co. Mr. Battle reviewed the present labor situation in coal with special emphasis on the dangerous practices that are bound to result from the health and welfare fund as secured by John L. Lewis. Ivan A. Given, editor of *Coal Age*, discussed Mr. Battle's paper. C. W. Thompson's presentation was entitled "Experiences with Underground Belt Conveyors." The first portion of Mr. Thompson's excellent paper is given in an article in this issue. The paper was discussed by W. A. Haslam of the Island Creek Coal Company. The meeting ended with a reception and dinner. Joseph Pursglove, Jr., presided at the dinner in the ballroom of the West Virginia Hotel and L. E. Tierney acted as toastmaster. The guest speaker was Dr. Irvin Stewart, president of West Virginia University, who spoke on the subject of "Coal and the University." The meeting was unusually well attended and all who were present considered the gathering an outstanding success.

Changes in Personnel at Fairmont

W. L. Doolittle, president of Consolidation Coal Company of Fairmont, has announced the following changes in personnel: Charles Sabo has been transferred from Mine 32 as general mine foreman to Arkwright Mine as assistant mine foreman; George R. Chaplin has been promoted from inside labor to position of section foreman at this same mine. At Mine 25, Pinnickinnick, Chester S. Conrad has been named maintenance foreman, who recently returned from service in the U. S. Navy. At Mine 38, Fairmont, America Beccaloni has been

promoted from inside labor to position of section foreman. At Mine 93, Jordan, Steve Laboda has been promoted from inside labor to position of section foreman. At Mine 98, Nora, Edgar L. Zuspan was promoted from acting construction foreman to section foreman. Jesse G. Bowers has been transferred from Mine 38 as section foreman to time study engineer for all West Virginia mines.

Stokers to Heat Oak Ridge



Despite the much talked of generation of heat and power by atomic energy it is interesting to note that schools, dormitories, stores and other buildings at Oak Ridge will be heated this winter with coal stokers. The U. S. Machine Corporation of Lebanon, Ind., is installing 63 stokers purchased by Army Service Forces for the Manhattan District. Most of these stokers are self feed models burning up to 550 lbs. per hour. It was at Oak Ridge that uranium (U-235) was concentrated for use in the atomic bomb which blasted Hiroshima and Nagasaki prior to the ending of war with Japan.


Report Released on Zinc Property

A preliminary report on the Stiner zinc prospect, Union County, Tenn., has been published by the U. S. Geological Survey, Department of the Interior, and placed in open file. Survey Director William E. Wrather reported November 25. The Stiner property, near the shore of Norris Reservoir, is one of several prospects studied by the Geological Survey as a part of war-time investigations of lead-zinc deposits in the Powell River region.


The results of the investigation are summarized in a brief text describing the geologic structure, mineralization and results of diamond drilling of the property. Drilling operations were done in cooperation with the Bureau of Mines. Accompanying the text are three illustrations and 13 detailed drill logs prepared by survey geologists.

The report is not available for general distribution, but in conformity with the plan to release, as soon as it can be prepared, information on mineral deposits examined during the war, copies have been placed in open file and may be consulted in Washington, D. C., Nashville and Jefferson City, Tenn.

New Addition to Phosphate Plant

 Construction has just started by International Minerals & Chemical Corporation on a new sulphuric acid plant as an addition to its present commercial fertilizer plant at Spartanburg, S. C. According to Louis Ware, president, the new addition is expected to be ready for operation by June, 1947. The new plant will enable the company to furnish all the necessary raw materials that it uses in the manufacture of its superphosphate at Spartanburg. The company already mines its own phosphate and potash which, together with the sulphuric acid, represent the major components in commercial plant foods. At present, its manufacturing facilities in Spartanburg include an acidulating plant and a mixing plant. When operating at full capacity, the new plant addition is expected to produce about 20,000 tons of sulphuric acid annually.

Dates for Safety Convention and Exposition Announced

 The 17th Annual Safety Convention and Exposition will be held in New York City for four days beginning March 25, 1947. There will be 49 separate sessions, all at the Hotel Pennsylvania and 300 speakers including experts from all over the nation on various phases of safety, leaders in Government, industry and

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labor, and traffic officials, educators and engineers.

William F. Brown, general chairman of the executive committee, disclosed that the 1947 convention would have, for the first time, a labor-management session, in an attempt to halt the industrial accident rate which has risen steadily since the end of the war.


The exposition, annually the largest of its kind in the East, will display in 114 booths the latest developments in safety devices and equipment. The convention had an attendance last year of 8,000 persons who registered from every state of the Union. The Greater New York Safety Council is sponsoring this event.

Walkie-Talkie Tried Out Underground

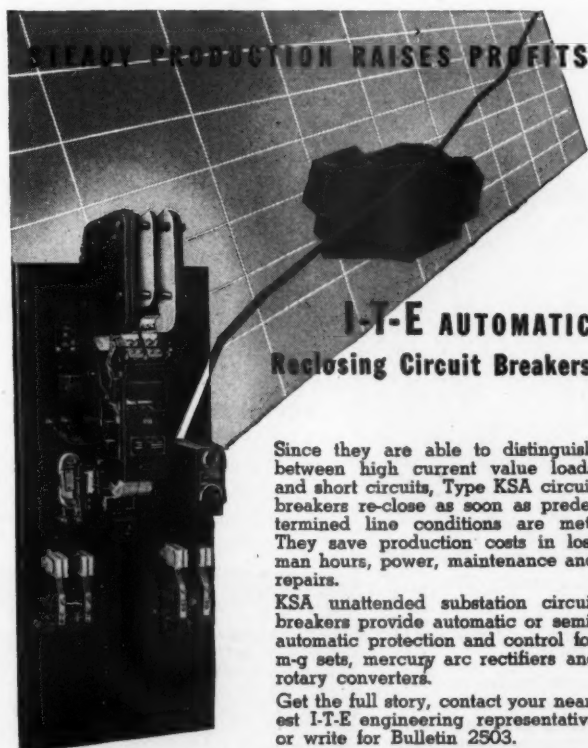
 At a recent experiment conducted at the Hanna Coal Company's Willow Grove Mine a "Walkie-Talkie" was experimented with for underground communication. The motorman could hear conversation exceptionally well from outside regardless of where his motor was located inside the mine, and regardless of whether he was in motion or stationary. The outcoming calls

from the motor were less distinct but audible and tests are still being conducted. This portable radio transmitter and receiver will permit motormen to report needs to central switchboard in the tippie or to receive instructions anywhere along the line from dispatchers outside the mine. Although the equipment is still in an experimental stage Jim Hyslop, the company's vice president in charge of operation, has indicated that results are very promising.

Coal Institute Receives Charter

 On November 13, the North Carolina Coal Institute, Inc., received its charter from the Hon. Thad Eure, Secretary of State, at a meeting held in Greensboro at the O'Henry Hotel. Eure stressed the importance of the organization, which he felt could be of great service to the coal consuming public and the industry. He then personally presented the certificate of incorporation to J. P. Erwin, president of the Institute. After thanking Secretary Eure, Mr. Erwin outlined the future program of the Institute. The next meeting of the organization will be in January at a date to be designated.

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Central



States

Ore Producers Hold Meeting

On November 25 the annual meeting of the Tri-State Zinc and Lead Ore Producers Association was held at Joplin. New directors were elected and there was a general discussion of association activities for the coming year. Speakers who were scheduled to participate in the program were Howard I. Young of St. Louis, president of the American Zinc Institute and American Mining Congress and also president of the American Zinc Lead and Smelting Company and Ernest V. Gent of New York City, secretary of the American Zinc Institute.

Bureau of Mines Estimates Indicate Zinc-Lead Reserves

Zinc-lead ore reserves of the Tri-State district of Kansas, Oklahoma and Missouri are estimated at nearly 51,000,000 tons of minable ore, valued at approximately \$171,000,000 based on current prices, according to a Bureau of Mines survey made public November 1 by Secretary of the Interior J. A. Krug.

The bureau's preliminary report on the survey is a revision of an un-

published estimate made in 1944 by the bureau of the War Production Board as a reconversion guide. Dr. R. R. Sayers, bureau director, reported to Secretary Krug, with a final estimate on the region yet to be made. This preliminary report, brought up to January, 1946, places the reserves at 50,735,500 tons of minable ore, valued at \$170,935,275.

Although only 6,569,000 tons of new reserves were added in the Tri-State district in 1944 and 1945, 16,587,000 tons were mined, the report shows. Thus, lead and zinc ores were taken out nearly three times as fast as new ores were charted. Faced with labor shortages and reduced technical staffs, the mining companies during the war years had to concentrate on production while vital development programs were deferred.

Underground Iron Supply Exhausted



The Webb Mine at Hibbing has exhausted its underground reserve of iron ore but will continue to operate as an open pit in the future. This is one of the oldest underground properties in the Hibbing area as operations were started in 1906. The Webb Mine is owned by the Shenango Iron Mining Company

and is located east of the town of Hibbing.

Practical Information on Overfire Jets Discussed



Williams S. Major, development engineer for Bituminous Coal Research, Inc., Pittsburgh, Pa., was the principal speaker at Milwaukee on November 12 during a meeting of the Solid Fuel Institute in which modern methods of smoke control were discussed. Major's audience, made up largely of coal men, railroad representatives and technicians of heating and power equipment manufacturers, was brought up to date on the expanding use of modern overfire jets—as designed by BCR, the national research agency of the bituminous coal industry—to prevent smoke in stationary plants. The BCR engineer's talk, which provided practical information on installation and operation of jets, also gave the "performance story" of overfire jets under fluctuating steam loads. The meeting was arranged by M. J. Clancy, managing director of Solid Fuel Institute, and Conrad Cook, chairman of the organization's education committee.

International Mining Days an Outstanding Success



The International Mining Days' celebration sponsored by the Mining Committee of the El Paso Chamber of Commerce completed a very successful two-day meeting in El Paso on November 2. Under the able chairmanship of Dean E. M. Thomas, of the Texas School of Mines, a comprehensive program of entertainment was carried out. Visiting mining men from throughout the Southwest heard Mr. H. M. Laverder, vice president and general manager of Phelps Dodge Corp. give an excellent resume on the history of the Morenci mining development. Included in the program was a ranch style breakfast at the Cortez Hotel for the visitors given by the El Paso Rancheros. At the business meeting which was addressed by Mr. Laverder, Dean Thomas welcomed the visitors and introduced delegates from throughout the Southwest and Mexico. A buffet supper which was sponsored by the mining supply houses of El Paso featured the closing of the first day. The second day of the meeting was devoted to a visit to Fort Bliss in the morning and a Sourdough supper (barbecue) featured the evening entertainment in the Livestock Building adjacent to the El Paso Coliseum.

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The Mining Committee consisted of Dean E. M. Thomas, chairman; J. J. Shores, secretary; R. S. Beard, Robert J. Benson, W. R. Blair, Robert D. Bradford, C. C. Cragin, M. S. Darbyshire, J. E. Despina, E. (Bud) Flanagan, Homer C. Hirsch, William Knowles, H. J. Kongabel, Gus Mommensen, Jr., A. L. Washburn, A. V. Winther, E. C. Wise.

Homestake Miners Receive Increase



Pay raises for employees of the Homestake Mining Co. at Lead went into effect November 1.

All underground workers received a 10c an hour boost and rates for contract work were adjusted accordingly. Surface employees received a raise of 8c an hour.

This increase in pay is the third since the Homestake resumed production last year after the wartime shutdown. The totals of the three wage increases range from 22c an hour for surface workers to 28c an hour for miners and other underground employees. In addition, 6c an hour differential pay for the night shifts was inaugurated September 1, 1945.

New Bulletin Correlates Stoker and Laboratory Results on Fuels



An important bulletin recently published by the State Geological Survey of Illinois is entitled "Correlation of Domestic Stoker Combustion With Laboratory Tests and Types of Fuels." This bulletin was written by Roy J. Helfinstine and Charles C. Boley under the direction of M. M. Leighton, chief of the Survey at Urbana. The bulletin reports results of an extensive series of tests conducted to observe the formation of coke in the fuel bed, smoke emission, and the nature of clinker. The primary objective of the tests was to determine the degree of correlation existing between combustion characteristics of Illinois coal in domestic stokers and their chemical property and petrographic composition. The bulletin is of unusually comprehensive nature and will be extremely valuable to those concerned with analyzing Illinois coal for industrial purposes.

Heavy Media Plant Starts Operations

Recently the Fluorspar Division of the Aluminum Ore Company started

operation of a new heavy media separation plant at Rosiclare, Ill. This new mill was designed to raise the grade of flotation feed and has a rated capacity of 25 tons per hour.

University To Study Coal Heating

Rudard A. Jones, one of the nation's outstanding younger architects, has been appointed a research associate professor in the University of Illinois to carry on a new three-year study on planning and design for use of coal in home heating. The new project at Illinois will deal with such subjects as coal storage and handling, ash handling, furnace or boiler location and the arrangement of heating facilities for most convenient use of coal. It will involve study of equipment and house plans, and development of suggestions for builders and homeowners.

He will work on the architectural aspects in using coal in the home. His first interest will be to study the most effective use of existing coal-burning and coal-handling equipment and facilities. Then he will apply this information to developing various types of house plans, emphasizing basements and heating plant layouts, as suggestions for architects and contractors.



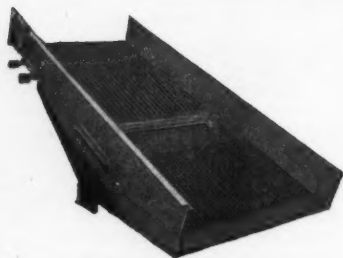
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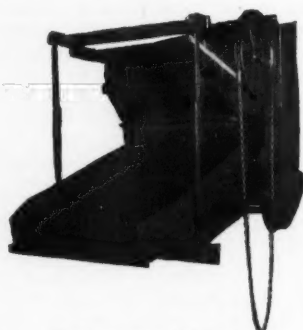
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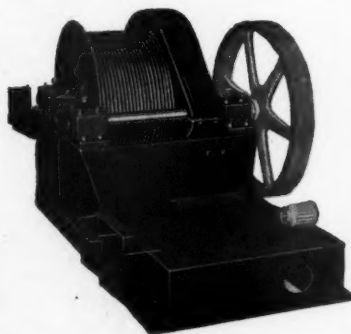
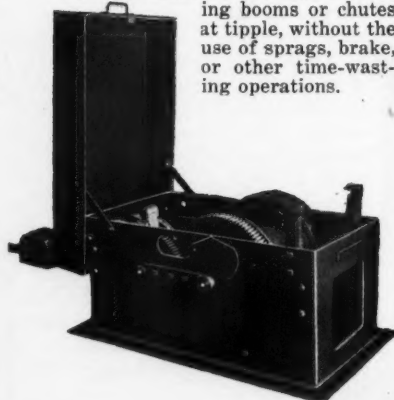


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DANVILLE ILLINOIS

Mining Rights to be Auctioned



With a view toward stimulating low-grade iron ore development, the Michigan Department of Conservation will auction during December mining rights to 700 acres of state-owned ore lands in Gogebic County. The ores, department officials report, can be mined profitably only if economic methods of beneficiation can be devised.

The leases are to be offered on a 50-year basis with a 10-cent-an-acre yearly rental. The leaseholder must agree to spend \$7,500 the first year, and \$5,000 each year thereafter on each lease in the "exploratory period" which runs to 1950, with the minimum royalty fixed at \$200 per 40 acres thereafter. The royalty rates will be on a percentage basis.

Production Begins at Copper Plant



Production has started at the new plant of the Indiana Rod and Wire Division of the Phelps Dodge Copper Products Corporation at Fort Wayne. The new plant, costing approximately \$4.5 million, is equipped for copper rod rolling, and wire drawing, stranding and insulating on a large tonnage basis.

Wylie Brown, president of the Phelps Dodge Copper Products Corporation, in announcing the start of production at the new plant, emphasized that it was built entirely as a private project and was decided upon "because of the certainty of increased post-war demand from the great mid-western area for the products the company manufactures."

Rolla Students Visit Tri-State



On December 6 and 7, 54 senior mining students of the Missouri School of Mines and Metallurgy met for a joint meeting with the American Institute of Mining and Metallurgical Engineers at the Connor Hotel in Joplin. The students visited mines and mills of the Eagle-Picher Co. and also had a trip through the Galena smelter. The students were also guests of Guy H. Waring of Oronogo Mutual Mining Company where they visited the famous open pit mine and saw approximately 50,000 tons of rock broken by blasting on the north side of the cave area. Speakers for a special dinner were Curtis L. Wilson, dean of the School of Mines, Allen McReynolds of Carthage, Cowgill C. Blair and Dr. Edward L. Clark of Rolla, director and geologist of the Missouri Geological Survey.

Western



States

Early Winter Fails to Slow Mining Activity



Despite the unusually heavy early snow that swept Colorado through the month of November, there has been little diminishing in mining activity. Instead of closing up shop and hibernating through the long winter months, miners are hard at work. The shortage of labor is still acute but materials are beginning to flow to the mining camps in a more satisfactory manner. It is anticipated that metal activities which are now going strong will continue through the winter in the five most active producing counties of the state: San Juan, Ouray, Lake, Dolores, and Eagle. In addition there has been a burst of activity in San Miguel County where the Silver Bell Mine properties are being completely renovated in preparation for the working of 13 patented and 42 unpatented claims.

Topaz Mining Co. Active in San Juan District

The Topaz Mining Co., consisting of T. J. Farmer of Durango, Wm. Hunt and Elmer Banks of Silverton, and F. A. Sutton of Dove Creek, has leased the Coming Wonder mine on Anvil Mountain and is actively at work. A road nearly a mile long is almost completed and ore chute and

ore bins are being erected. A compressor is installed and production of mill ore is to be started at once. Smelter grade ore is expected when stopes contact veins discovered in upper workings.

Work Started in Idaho Springs District

John Deerkson of Denver, who for many years has been operating the Strong Mine in the Cripple Creek district, has recently acquired the Mattie Mine, located two and one-half miles up Chicago Creek from Idaho Springs. Work started at the Mattie recently to put it in shape for production. A crew of men are cleaning out the tunnel and repairing the surface buildings in preparation for the installation of several truck loads of new mining machinery. Present development plans call for a cross-cut and the sinking to greater depths of the Newton Shaft. Shipping ore will be sent to smelter, and milling grade ore will be handled in local mills during the winter months. A new mill is in the blueprint stages and will be erected in the spring of 1947.

Mr. Deerkson also operates the Melvina Mine in the Gold Hill mining district, Boulder County, where a new surface plant of machinery is being installed. The three properties (Strong, Mattie and Melvina) will be operated under the name of the Front Range Mines, Inc. John Deerkson is president, George Teal of Boulder, vice president and general manager, and Dan Kamphausen of Denver, secretary-treasurer.

Legislative Committee Appointed for 1947



President E. C. Iden, Albuquerque, of the New Mexico Miners and Prospectors Association, acting on a resolution by the board of directors, has announced appointment of a legislative committee for the 1947 session of the State Legislature, meeting January 15 to March 15. Members of this committee are F. O. Davis, Potash Company of America, Carlsbad; Horace Moses, Chino Mines Division, Kennecott Copper Corp., Hurley, and George Warner, fluorspar operator, Albuquerque. Ex-officio member of the committee will be Jack C. Pierce, secretary of the State Association.

Operations Resumed at Zuni Milling Co.

The Zuni Milling Co., which is the fluorspar division of Shattuck-Denn Mining Co., recently resumed operations at their mill in Los Lunas, 21 miles south of Albuquerque, after having been closed down for a year. The management reports a very marked increase in the demand for chemical grade calcium fluoride.

New Bulletin to Stress Importance of Mining

The mining committee of the Albuquerque Chamber of Commerce has begun publication of a monthly bulletin to acquaint New Mexico's leading wholesale and retail business firms with the importance of mining to the state's banking and commercial center. Quoting figures from the U. S.



"Build yourself a fire, will you? This ain't no signal station"

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Yuba dredges for placer dredging now can be furnished as in the pre-war years. For nearly forty years Yuba has specialized in the design and construction of bucket line and other types of dredges for the mining industry. Yuba dredges weighing less than 200 tons and digging only ten feet of gravel are as carefully engineered and built as 3,500-ton deep diggers built by Yuba for California gravels lying 175 feet below ground level.

Every placer deposit presents peculiar conditions. During Yuba's long experience, practically every question concerning dredging practice has been discussed by its engineers. Many of the advances in placer dredging have resulted from problems presented to Yuba for study. A Yuba dredge in California digs the hardest known bed rock in any placer deposit of the state. Two other Yubas dig 124' and 112' below water level against banks 50' high if necessary.

Other Yuba dredges in the west and in Canada and Alaska vary in bucket size from three to eighteen cubic

feet capacity. They are powered by electricity or Diesel-electric units as the operating region dictates. Each was designed with digging ladders, screens, gold saving tables, lifts, sand wheels, stackers, pumps and all the other units of a dredge, as best suited the property to be dug and the gravel to be handled.

If you own a dredge, consult Yuba about repairs, rebuilding or moving. Yuba has redesigned and modernized many dredges, some thirty years old. New pontoon type portable hulls can be furnished and a dredge moved to new property, thereby greatly increasing its life and value. Bring your dredging problems to experts in the Yuba organization; it is probable that any dredging question you can ask has been discussed many times in connection with one or more Yuba dredges built in the past.

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Bureau of Mines, the bulletin shows total mine production of \$126,230,000—or \$345,835.61 daily. The Albuquerque Chamber of Commerce is actively cooperating with the New Mexico Miners and Prospectors Association, to make the state mining-conscious.

Alta Mine Will Resume Operations



One of the most important mining transactions within the Helena district for the year was revealed late in November when it was reported that E. W. Hyde of Portland, Oreg., had taken a lease and option contract on the Alta mine, located in the Wickes district.

The Alta mine, credited with being the largest lead producer in Montana, has been owned by one company since its discovery in 1866—the Alta Mines Corp., composed of a closed group of eastern shareholders. During its early operations when lead sold for only 2½ cents to 3 cents per pound, its production totaled a million tons from which was recovered in excess of \$32 million. The ore values are silver-lead principally with some copper and gold; zinc occurs sparingly.

Mr. Hyde, in disclosing plans for rehabilitation of the property, stated the engineer of the mine when closed in 1922 has been retained as consulting engineer. This, he declared, will enable operations and production to be resumed where the former operations ceased, as soon as the workings can be unwatered and equipment installed.

Financing plans entail an expenditure of approximately \$75,000 for modernization of the property to facilitate production of 250 tons daily.

Meeting of Northwest Mining Association



On December 6 and 7 the Northwest Mining Association held its 52nd annual meeting at Spokane. The theme of this meeting was the discussion of problems confronting the mining industry on its return from wartime production under government regulation. The problems of development in producing mines, prospecting, and the development of new properties also keynoted the sessions. The program was under the direction of P. E. Oscarson, who was chairman of the program committee and was assisted by Elmer Johnston, Howard Sherman, James Leonard, Roger C. Oscarson and Bliss Moore. Wray D. Farmin is president of the association.

Gold King Resumes Activities in Mohave County



New equipment to complete the 100-ton mill is arriving daily at the Gold King Mine in the Hualapai Mountain. This gold-silver property is owned and operated by the Moss Canyon Mining and Milling Co. H. R. Stayton, president of this concern, has been living at the camp site and is actively engaged in the setting up of operations.

The original shaft on this property was sunk in 1931 on the top of a steep mountain side. It was an incline shaft with drifts running eastward. A tunnel was driven into the mountain 100 ft. lower and underhand stopes were worked from the tunnel. The present operators plan to cross-cut from a new shaft which is at present approximately 40 ft. in depth and plans call for the tapping of known ore bodies discovered in the previous workings. It is expected that production will be under way shortly.



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MT. VERNON, ILL.

Mill to be Converted



The Four Square gold mine and mill on Prichard Creek, near Murray, has been sold to the Crown Point Mining & Milling Co., a Seattle, Wash., corporation headed by William A. Kruppachne and William Redmond. Plans of the new company include conversion of the milling plant into a dual milling process for the treatment of both gold and silver-lead-zinc ores. The district in which the plant is located has never had a custom milling plant and, except for one or two privately owned mills, all silver-lead ores from the district have had to be shipped over two ranges of mountains to Wallace, the nearest treatment and shipping point.

The Four Square mill and mining equipment represents an original investment of \$300,000 by the old company. No milling of its gold ores was ever attempted except a test run on 7,000 tons, which netted the company \$35,000, or a flat \$5 per ton. This test revealed the fact that the ore contained considerable tungsten, which the mill was not equipped to save. Before improvements could be made, the mine became involved in legal difficulties, which was further augmented by the government's gold mine closing order. The Four Square property was owned by the Trinity Trust Company, owners of the Gold Creek group on mining claims in the Mullan section of the Coeur d'Alenes.

Rich Ore Shoot Proven

The rich ore shoot at the Lucky Friday mine at Mullan has now been proven for a distance of over 300 ft. on the 1,400-ft. level and has produced some 1,000 tons of ore during the drift development. This tonnage is now being milled at the Golconda mill, with the mill feed averaging 22 oz. of silver, 4 per cent lead and an undisclosed quantity of zinc per ton. The Lucky Friday ore body is in a shear zone crossed at intervals by local step faulting, each one of which deflects the vein a short distance to the south. The mine has paid its own development and equipment expenses from the start from profits from ore shipments.

New Gypsum Plant to be Constructed



Directors of the United States Gypsum Co. have authorized construction of a large gypsum plant at Sigurd, Utah. The new plant, 130 miles south of Salt Lake City, is to be located on 920 acres of extensive deposits of gypsum purchased by the

company in 1936. These deposits have a proven reserve supply for 100 years. William L. Keady, company president, announced the Sigurd plant will be "thoroughly modern and equipped with vastly improved machinery."

New Development Work Reported from San Francisco District

The old Horn Silver property, located in the San Francisco mining district, Beaver County, Utah, is reported responding to development work, which is being performed under

a lease arrangement by Metal Producers Associated of Los Angeles.

Regular shipments are now being made to Salt Lake Valley smelters and the lessee has 40 men at work. Due to the tonnage of low-grade ore developed, consideration is being given to the erection of a milling plant near the Horn Silver.

Should the plant be installed, it would possibly result in the opening of the old Newhouse Mine, situated about 20 miles southwest of the Horn Silver. A sizable tonnage of low-grade lead ore is known to exist on this property.

CORONET

PHOSPHATE

FLOTATION

Another **JOB-PROVED**

Denver "Sub-A" Application

Standard, JOB-PROVED Denver "Sub-A" Easily Adapted to Phosphate Flotation

Like many other successful phosphate operations, Coronet Phosphate Co. uses job-proved Denver "Sub-A" Flotation. Supercharging and double overflow, easily added to the Standard Denver "Sub-A", met all the requirements of this particular phosphate problem... giving the larger tonnage and froth removal capacity essential to high metallurgical efficiency in treating this fast-floating, coarse material. Two 4-cell No. 24 Denver "Sub-A's" handle 40-50 long tons per hour of -48+150 mesh material at 40% solids.

Three Repeat Orders for Denver Diaphragm Pumps

Open pit sluicing operation results in an erratic flow of pulp to processing plant. Coronet Phosphate uses 6" Duplex Denver Adjustable Stroke Diaphragm Pumps to positively control this feed to produce a constant flow of pulp to the flotation circuit.



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RICHMOND, AUSTRALIA, 530 Victoria Street

Famous Tonopah Property Resuming Work



Repair work is in progress at the Desert Queen Shaft following delivery on the property of the Tonopah Belmont Consolidated Mines Co. of 36,000 ft. of heavy mine timber. The shaft is to be repaired and cleaned to the 1,000-ft. level and ore pockets will be cut at each production level and self-dumping skit will be installed.

W. J. Loring, manager of the property, stated that the mine workings will be put in shape for economical and efficient operation. Mechanical mucking machines are to be used and all transportation will be by modern storage battery locomotive equipment where underground conditions permit. Plans are also being prepared for installation of 250-ton flotation-cyanide mill and a new Marcy ball mill of this capacity has been ordered and will be delivered equipped with an Akins classifier. Completion of this mill will provide employment for a large crew of men and it is anticipated that, when completed, this operation will be the largest in this part of Nevada.

STRIP MINING

"The SAUERMAN Way"



At Velve Mine of Truax Tracer Coal Co., a tower machine equipped with 12 cu. yd. Sauerman Crescent scraper strips a wide cut, handles 7500 cu. yd. every 24 hours.

SAUERMAN Tower Machines offer an improved, economical means of stripping large bodies of coal or ore.

On such work, the long reach of a Tower Machine enables it to make a much wider cut than is possible with other types of equipment. Not only does it make a wider cut, but at the same time it disposes of the spoil just where wanted.

These machines also are used successfully in loading loose materials from pits and in handling large stockpiles. For this type of service the head tower is equipped with an adjustable ramp.

Write for Catalog

SAUERMAN BROS., INC.
540 S. Clinton St. CHICAGO 7

Wheels of Government

(Continued from page 48)

tal over \$4½ million. It is of interest to note that this settlement, made with UMW District 50 assistance, is understood to be in lieu of a 20 per cent wage increase demanded by the union. This is illustrative of what is said to be the general attitude on the part of unions today, where travel time and other "fringe" concessions are sought, instead of specific wage increase.

A recent ruling of the Wage-Hour Division affecting travel time pay claims where transportation in company vehicles has been available to the men reads as follows: "In general, it is the position of the Division that if the employees are not required to report at a place other than the job site, if other reasonable means of transportation to the job site are available, and if the time required to reach the job site is not unreasonably disproportionate to the normal travelling time required to reach the employee's place of employment, the mere fact that the employer furnishes transportation to the job site need not cause the travel time to be considered hours worked."

Foreign Trade Agreements

With only six weeks allowed in which to prepare briefs, the long-awaited State Department list of commodities subject to possible reductions in duties was made available over the November 10 weekend. The list covers the proposed negotiations for trade agreements with 18 foreign countries. Briefs and applications to be heard at the oral hearings on January 13, 1947, must be filed by December 21. Nations participating in the negotiations are Australia, Belgium, Brazil, Canada, Cuba, Czechoslovakia, France, Luxembourg, Netherlands, United Kingdom, Chile, China, India, Lebanon, New Zealand, Norway, Soviet Union and the Union of South Africa. Agreements are to be sought not only to reduce tariffs but also to eliminate import quotas quantitative controls, and special preferences, to adopt most-favored-Nation provisions and to revise certain valuations and customs practices.

Included in the public list are the major portion of all the commodities covered in the Tariff Act of 1930. Also subject to negotiation will be the import excise taxes on copper and coal. It is important to note that quicksilver, and lead ores, lead bullion and pig lead are not included in the list.

Complete information on the list and procedures may be obtained by addressing Trade Agreement Negotia-

tion Information, Room 140, State Department Building, 17th and Pennsylvania Ave., N.W., Washington 25, D. C.

Remove Wage-Price Controls

By executive order, effective 12:01 A.M. November 10, government price controls (except on rent, sugar and rice) and limitations on wage increases went "out the window." In returning the country to a free market with free collective bargaining, the President stated his conviction that "the time has come when these controls can serve no useful purpose. . . . There is no virtue in control for control's sake. When it became apparent that controls are not furthering the purposes of the stabilization laws but would, on the contrary, tend to defeat these purposes, it becomes the duty of the Government to drop these controls. . . . In short, the law of supply and demand operating in the market place will, from now on, serve the people better than would continued regulation of prices by the Government."

Administrator Paul Porter of OPA has resigned and the last semblance of the OPA and CPA organizations is to be consolidated into a single unit, perhaps under OWMR.

Import controls were removed on lead and copper in mid-November. CPA ordered the RFC to terminate Government purchases of these metals except where necessary to fill commitments already made. Following the removal of these restrictions the market price of lead rose from 10.50c to 11.80c and copper rose to 19.50c a pound. The lead tariff of 1 1/16c and the copper import excise tax of 4c a pound apply to all private imports.

Premium Price Plan

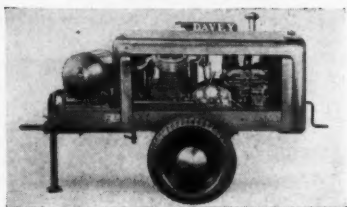
The Premium Price Plan for copper, lead and zinc is to be continued until June 30, 1947. OWMR Director Steelman stated November 20 that, "the removal of price controls on copper, lead and zinc will not interfere with the operation of the Premium Price Plan since market prices for these basic metals are now used instead of ceiling prices in calculating the premium payable." The "A," "B" and "C" and "special copper" premium ranges are being converted to premiums expressed in cents per pound of metal to simplify operation.

Stelman stated that expenditure under the Premium Price Plan from July 1 through November 9 was \$25 million; the Plan is estimated to cost \$7,700,000 for the balance of 1946 and \$27,300,000 in the first six months of 1947. The total will thus be \$60 million for the fiscal year out of the \$100 million authorized in the OPA Extension Act.

MANUFACTURERS FORUM

Davey Offers New Compressor

The Davey Compressor Co., Kent, Ohio, has just announced a new Model 60V portable compressor for 1947, according to Paul H. Davey, president. This unit is available in standard skid and two-wheel pneumatic tired trailer mounting styles, also with flanged wheels for railroad work.



It is likewise offered (complete with a Davey heavy duty power take-off) as an "Auto-Air" compressor for truck mounting. The compressor produces 60 cfm. at 100 lbs. pressure and is designed for heavy duty service.

Weight of the two-wheel model is 2,100 lbs. Overall dimensions are: Length, 88 in.; width, 62 in. (tire track line, 52½ in.); height, 51½ in.

The compressor (in skid, trailer and railway models) is powered by a Hercules IXB engine.

Link-Belt Electrofluid Drive Announced

Following prolonged satisfactory use on a variety of installations, Link-Belt Company has announced the development of a new and revolutionary type of "packaged" power unit, to be known as Link-Belt Electrofluid Drive. It is presently available in horsepower up to 20.

The electrofluid drive is a neat, compact, motorized hydraulic combination consisting of a general-purpose A. C. induction motor flange-mounted on a sturdy housing containing a hydraulic coupling, also called "fluid coupling." Its output shaft may be direct-connected to the driven machine or to a speed reducer unit. It may also be connected to driven machine through the medium of chain, gear or belt drives.

Claimed advantages of the electrofluid drive have been summarized as follows: It has smooth, easy pick-up when starting; permits the use of a motor selected for the load normally developed; prevents damage to costly

power-driven equipment and motor; eliminates shear pins (properly selected and applied, the electrofluid drive offers automatic and dependable overload protection); is compact and easily installed; provides smooth, uniform transmission of power; allows driven equipment to be designed or selected on the basis of the maximum torque capacity of the electrofluid drive; and reduces operating and maintenance costs to a minimum.

The electrofluid drive is said to have wide application, including drawbenches, heavily flywheeled machinery, conveyors, compressors, cooling tower fans, printing presses, paper mill machinery, textile machines, ball mills, rubber mills, etc.

Link-Belt Book No. 2085, just released, gives full information and will be sent upon request to your nearest Link-Belt office.

Face Shield for Extra Over-All Protection

American Optical Company, Southbridge, Mass., announces a new face shield designed to give extra over-all protection, especially on jobs such as babbitting, handling chemicals and on operations in the manufacture of high



octane gas. The shield also guards against impact of flying particles and splashes of acids, oils, alkalis, hot water, etc.

The extra large window, 18¼ in. x 10 in., is made from cellulose acetate .040 in. thick. It extends completely around the face, even covering the ears. The fiber head guard protects the upper forehead and covers the entire top of the head as an additional safeguard against injury.



International Harvester "Young Fry" seated in the dozer blade of the big International TD-24 Diesel crawler tractor which will soon go into production at Melrose Park Works. The occasion was a recent "open house" held for employees of the new plant and their families. Over 7,000 visitors were on hand

The headgear is made for comfort and long wear. The band slides within a fibre sleeve in back, permitting easy adjustment to varying head sizes. A metal knob allows for quick adjustment. In front, a genuine leather sweatband absorbs perspiration. Positive friction joints hold the window securely in "on" or "off" guard position.

New Tire for Shuttle Cars

A new pneumatic tire for use on shuttle cars and other equipment used in underground mine service is announced by the B. F. Goodrich Company, Akron, Ohio.

The tire has been specially designed for the severe demands of mine operation, with round shoulders and extra thick sidewalls to protect it from snagging and cutting. It has two-way traction, which is essential since shuttle cars operate in both directions.

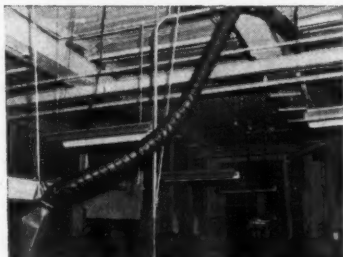
During development of the tire, company engineers studied underground conditions in mines and held numerous discussions with superintendents to learn exactly what service requirements had to be met.

The tire is at present being produced in several sizes including 7.50-15 ten-ply, the most popular size in this service. Maximum load at five miles an hour is 4,340 lbs., at 10 miles 3,880 and at 30 miles, 2,530.

Lightweight Flexible Tubing Exhausts Air, Dust, Spray

The ease with which "Spiratube" flexible tubing is installed makes it ideal for a great variety of semi-permanent as well as permanent applications, according to the manufacturer, the Warner Brothers Company, Spiratube Division.

The illustration shows the use of



"Spiratube" on a grinding machine to remove grinder coolant spray. One end is clamped to a metal hood near the grinder, and the other end connects the central exhaust line. This installation replaced rigid sheet metal duct. Machinery can be easily shifted without having to reinstall the more costly duct.

"Spiratube" is self-extending, non-collapsible and retractable. Thermoplastic-coated duck fabric is spiral-stitched around a single continuous helical spring core. There is no exposed metal inside or out. The manufacturer states that sharp turns are made with minimum crimping and minimum reduction of free area.

A new bulletin on "Spiratube" is available by writing Department 100, the Warner Brothers Company, Spiratube Division, Bridgeport 1, Conn.

Goddard Named Assistant Pittsburgh Division Manager for Gulf Oil

Homer A. Goddard, lubrication engineer, has been appointed assistant division manager in charge of industrial lubricating sales for the Pittsburgh Division of Gulf Oil Corporation, embracing western Pennsylvania and West Virginia.

Mr. Goddard, who came with Gulf in 1932, has been serving as superintendent of industrial lubricating sales for this territory. A graduate of Colorado School of Mines in 1925, he was previously employed in underground coal mine engineering by Consolidation Coal Co. and Pittsburgh Coal Co.; and in engineering sales by Bethlehem Steel Co. and Mine Safety Appliances Co.

He succeeds S. A. Newman, who has been advanced to the position of chief turbine lubrication engineer in the general office.

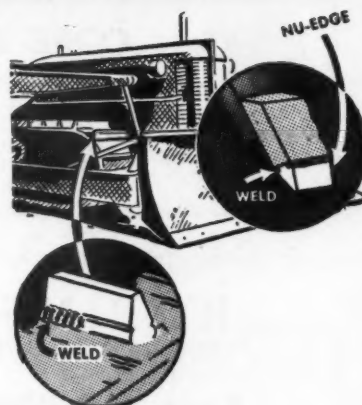


New Address

The San Francisco branch of Hardinge Company, Inc., York, Pa., manufacturer of mills, dryers, feeders, and other equipment for the mining, chemical processing and stone products industries, has moved to Room 24, 94 Natoma Street, San Francisco.

Re-Nu Edge Bar

The Allied Steel Products, Inc., of 7835 Broadway, Cleveland 5, Ohio, have recently marketed a special steel bar for salvaging bulldozer, drag and maintainer blades. The Re-Nu Edge Bar, as it is known, can be welded to square or worn edge of the blade with an all-purpose high grade steel electrode, such as an AWS 6012 or 6013. To prevent wear on the weld, this bead is then covered with a thin



layer of hard-surfacing electrode. The same material is also used around the ends or corner castings where the most severe wear takes place. This work-hardening steel edge will prolong the life of the blade many months, thereby effecting considerable savings in the cost of blade replacements.

The accompanying illustration shows how this material is used in a dual role, for repairing grouser bars on track shoes and for rebuilding bulldozer blades. A folder describing this Nu-Edge bar is available from the producers.

CATALOGS AND BULLETINS

EYE PROTECTION. *Mine Safety Appliances Co., Pittsburgh, Pa.* This new 8-page booklet describes a complete assortment of eye protection equipment including Chipper's Goggles, Chemical Goggles for protection against dangerous chemical particles and splashes, spectacles with side screen and leather shields, Dust Goggles, Drednaut Goggles designed for protection against flying particles from any direction, Welders Goggles with a wide choice of lens types, and other specially designed goggles for workers who must wear corrective glasses.

LOADING MACHINE. *Euclid Road Machinery Co., Cleveland, Ohio.* This new folder, Form No. 401, features an improved model of the Euclid Loader and contains more complete technical information than the catalog which it supercedes. The earth-moving machine that is described was developed by Euclid several years ago, and has been used on dams, airports, highways and railroad construction, industrial grading and over burden removal in strip mining operations. Numerous photographs illustrate the booklet and specifications are given on the last page.

UTILITY TOOL. *Templeton, Kenley and Co., Chicago, Ill.* This 4-page booklet describes the Simplex Util-A-Tool, a general utility jack which can be used for pulling, pushing, spreading, bending, clamping, and lifting. It is claimed that this piece of equipment will save time on countless maintenance, repair and production jobs. Jacks of various capacity are listed and illustrated and the booklet contains numerous photographs of the application of the tool.



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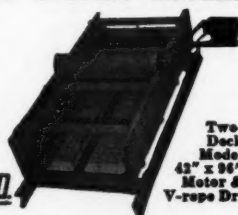
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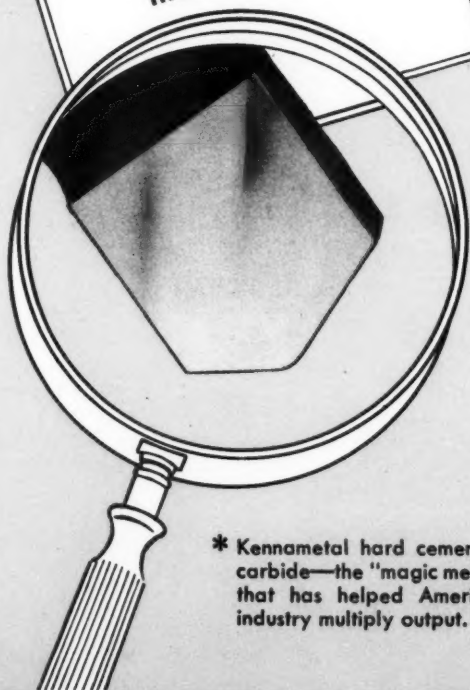
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hardness enables it to take a beating, outlast, stay
sharp, and do tough drilling jobs that ordinary steel
drills won't touch.

We will be glad to have our representative covering
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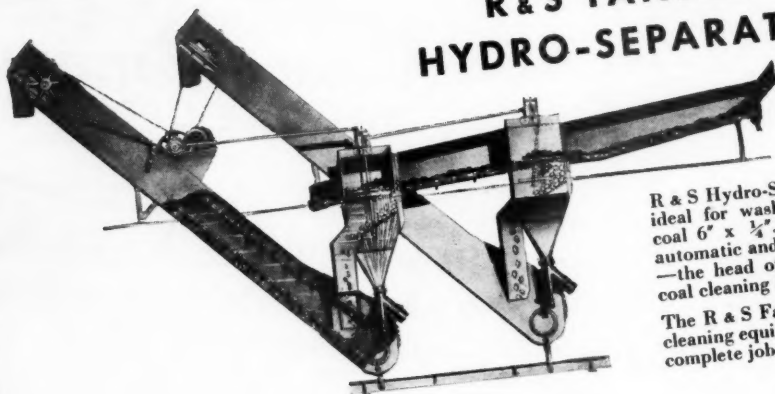


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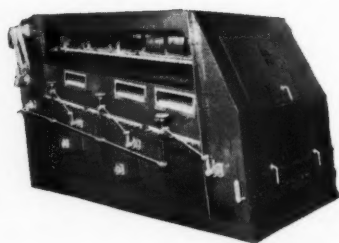
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R & S TANDEM HYDRO-SEPARATOR



R & S Hydro-Separator is ideal for washing coarse coal 6" x $\frac{1}{4}$ ". It is fully automatic and continuous—the head of the R & S coal cleaning family.

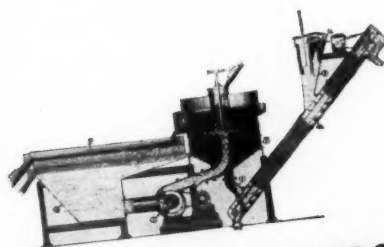
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